

TANDY LAPTOP COMPUTING

APRIL 1991 -VOL. 8, NO. 2

TERRY KEPNER'S

# portable 100

\$3.95/CAN \$4.95

A MONTHLY PUBLICATION (EXCEPT COMBINED JULY/AUGUST ISSUE)



*Dear Diary, it started small, just me and my wheels and my portable . . .*



*. . . and suddenly all these people showed up — with pizza!*



# Quality Disks at Bargain Prices!

## Premium 3.5" Diskettes



These disks work perfectly with the Tandy Portable Disk Drives, MS-DOS computers and Macintosh computers.

**CERTIFICATION:** Every diskette is tested and certified to be 100% error-free. All disks are certified to meet or exceed ANSI standards.

**Shipping:** 55¢ per 15 3.5" diskettes

★ 3.5" User Labels \$2.00 (50/pack) in combo packs of yellow, green, blue, & red.

## Premium 5.25" Diskettes

### Premium Diskettes!

**50¢** each

In lots of 500  
5.25" DS/DD 360K  
Lifetime Warranty  
Sleeves & WP Tabs Included Free!

### Special Quantity Pricing!

70¢ each in lots of 25

60¢ each in lots of 100

50¢ each in lots of 500

On 5.25" DS/DD  
Diskettes

Sleeves & WP Tabs  
included

**CERTIFICATION:** Every diskette is tested and certified to be 100% error-free. All disks are certified to meet or exceed ANSI standards.

**Shipping:** 65¢ per 25 5.25" diskettes

★ 5.25" User Labels \$2.00 (50/pack) in combo packs of yellow, green, blue, & red.

Send To: Portable 100 Hardware  
145 Grove St. Ext., POB 428,  
Peterborough, NH 03458-0428

Name \_\_\_\_\_ Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

How Many	Description	Price Each	Price Total	Shipping Each	Shipping Total

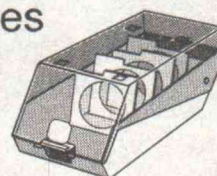
Charge to my: <input type="checkbox"/> Visa <input type="checkbox"/> MC	Merchandise	
<input type="checkbox"/> AMEX <input type="checkbox"/> Check/Mo	Total	
Account Number _____	Shipping	
Expiration Date _____	Total	
	C.O.D. Orders	
	add \$5.00	
(We do not charge your credit card until your products are ready to ship)	Order Processing, Packaging, & Handling	\$3.00
To Order	Add Shipping: 55¢ per 15 3.5" diskettes; 65¢ per 25 5.25" diskettes; 90¢ per Disk Case	
	Total	

Orders to: AP.O's, F.P.O's & Canada, add \$4.00 additional for shipping. Orders to AK, HI, VI, PR, add \$2.00 additional. Sorry, but we cannot ship outside the U.S. and Canada.

Portable 100 Call Now! 1-603-924-9455 ☎

## 5.25" & 3.5" Disk Cases

### 3.5" Disk Cases



**\$8.97** each  
(For 2 or more)

### 3.5" Disk Case Quantity Pricing!

\$8.97 each for 2 or more  
\$9.95 each in single units

★ 3.5" Disk Case protects and stores up to 50 Diskettes.

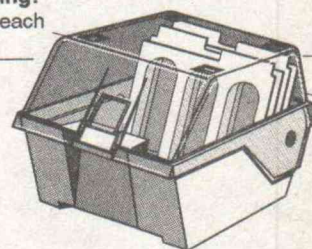
**Shipping:** \$1.00 each

**\$9.95** each  
(For 2 or more)

**Shipping:** \$1.00 each

### 5.25" Disk Case Quantity Pricing!

\$9.95 each for 2 or more  
\$10.95 each in single units



### 5.25" Disk Cases

★ 5.25" Disk Case protects and stores up to 70 Diskettes.



# Club 100

## A Model 100 User Group

**P.O. Box 23438, Pleasant Hill, CA 94523**

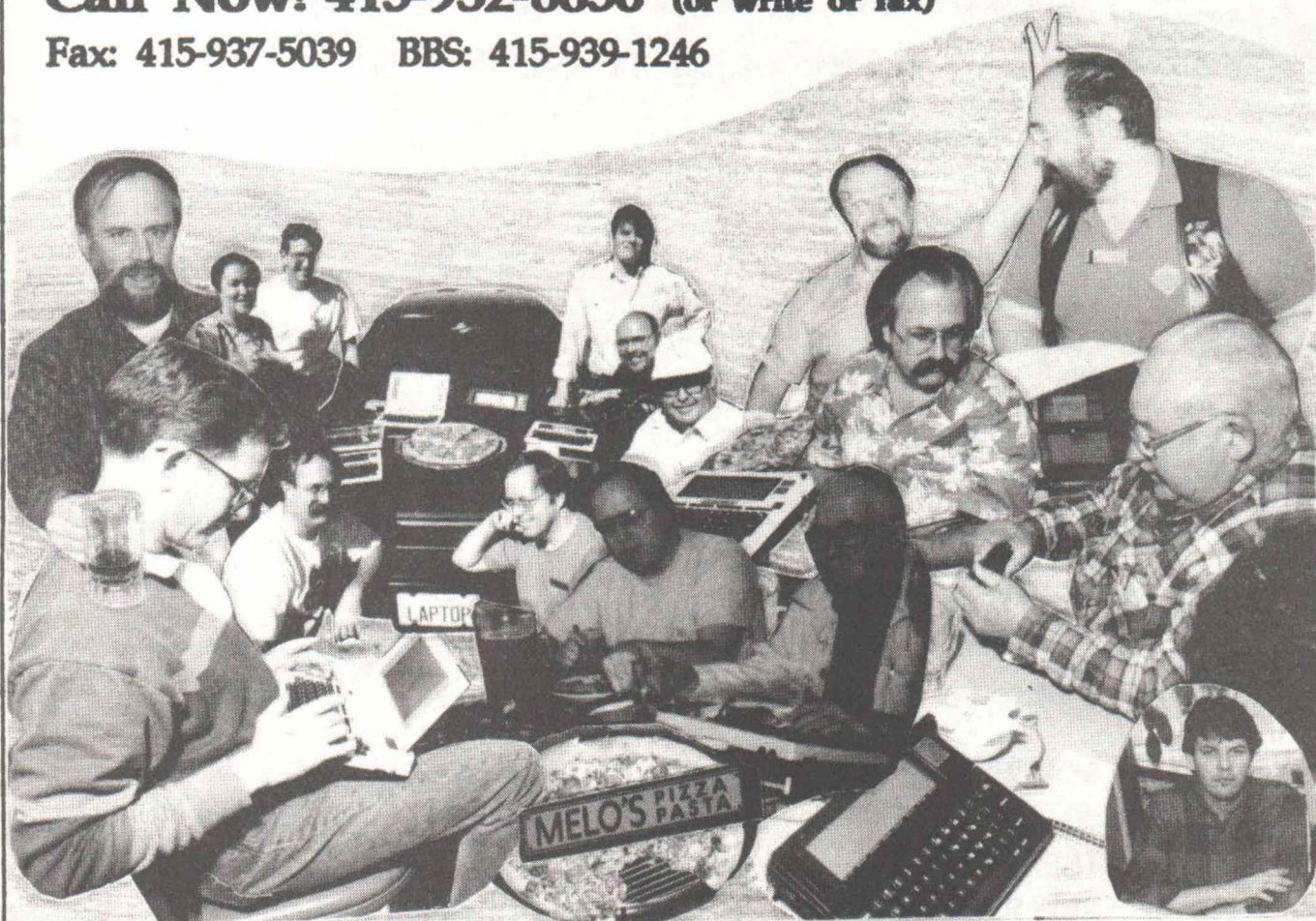
**THE BEST TANDY LAPTOP SUPPORT since 1983**  
For Model 100, 102, 200, and WP-2 Owners

Easy Laptop to Desktop connections. RAM Expansion. ROMware. Extensive product list. Laptop Software. Lots of free services. We are an association of laptop enthusiasts. We charge no dues. Put new life in your laptop. Discover Club 100 today.

**We're having fun and so can you. Join now!**  
**Receive FREE support and information.**

**Call Now! 415-932-8856 (or write or fax)**

**Fax: 415-937-5039    BBS: 415-939-1246**



**Send a picture of you using your laptop. We'll put you in our ads.**

**Circle 159 on reader service card.**



ON  
THE  
COVER:

Top: Club 100  
president  
Rick Hanson  
shows us his  
two favorite  
toys.

Bottom: Club 100  
members  
pose with  
their pizza,  
'puters, and  
pride!

TANDY LAPTOP COMPUTING APRIL 1991 VOL. 8, NO. 2  
TEARY KOPNER'S  
**portable 100**  
A MONTHLY PUBLICATION (EXCEPT COMBINED JULY/AUGUST ISSUE)



*"Dear Diary, it started small, just me and my wheels and my portable ...*



*... and suddenly all these people showed up — with pizzas!*

**IBM CHARACTER GRAPHICS  
ON THE MODEL T**

by Bill Gerber

*Spiff up your printouts! How to use  
the Epson/IBM-type character graphics  
on your printer with your Tandy 100, 102, or 200!*

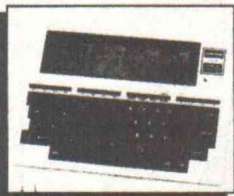
8

**HOMEBREW MODEL T  
CUSTOM GRAPHICS**

by Robert H. Pigford

*Use your Tandy 100, 102, or 200  
to create and print your own logos,  
letterheads, and other works of art!*

12



Tandy 102

**MACHINE LANGUAGE PROGRAMMING TIPS**

by Paul Globman

*Making your Model 100, 102, and 200 programs smaller, faster and safer.*

21

**THROUGH THE (8-LINE BY 80-COLUMN)  
LOOKING GLASS**

by Stan Wong

*Pushing the limits of your WP-2 word processor.*

22



Tandy 200

**CRDFIL-PC:**

by George Sherman

*The popular Model 100/102 software is now available for MS-DOS portables!*

25

**MOVING UP: CHAPTER TWO**

by Tony B. Anderson

*More tips on moving up from a Model T to MS-DOS,  
plus shareware to make the going easier.*

28



Tandy 600

**JOYRIDING IN THE MODEL T:**

**TANDY'S "CLASSIC" LIVES!**

by Gene Wilburn

*For the new owner of a Tandy 100, 102, or 200.*

33



Tandy 1400LT

**DEPARTMENTS**

**ROM WITH A VIEW**

*Still more improvements.*

3

**I/O**

*The wrong tree & Mike is right!*

4

**THE IDEA BOX**

*More about less.*

7

**NEW PRODUCTS**

*More and more and more!*

27

**PORTABLE 100 CLASSIFIEDS**

*Software, hardware, back issues.*

35

**ADVERTISERS' INDEX**

36



## ROM WITH A VIEW

**J**ohn says I'm not funny anymore. (Don't looks count?) My M100-toting, long-time pal always looked forward to my offbeat humor in *P100* articles, editorials, and such. And lately, he says, it just ain't there. The more "administrative" I've become, the less chance I've had to clown around in print.

Well, rest assured, ol' buddy, that beneath this "three-piece suit," there's still a comfy pair of Papa Smurf jockey shorts! Just takin' care of business, dude. And it's been shaping up nicely, too. For example ...

The issue you're holding is eight pages (that's 25-percent) thicker! Our little 32-pager is now 40 pages—something it hasn't been since October 1987. And I'm gonna keep on being not funny until it's 48!

Check out the new ads. Club 100 is expanding their offerings. F'rinstance, that little Konexx device on page 19 can be a lifesaver on the road.

Look at EME's ads. Their OWL is going great guns, and you should see what's in their catalog: gel-cell batteries, solar panels for power, sensors, transducers, and much more. (Betcha didn't know those things were available, did you?) Hardware heaven!

Microsense has changed their ad so you'll know more about the goodies they carry for your Tandy laptop. How about a 40 MB internal hard drive for your 1400? (Review next month!) An external floppy for your 1100 FD and my 1500 HD? (Yup, we use one regularly. Reviewed it in our Dec. '90 issue.) Give 'em a call, and tell 'em we said hello!

Pacific Computer Exchange is listing even more good deals on used Tandy equipment. We'll introduce the folks at PCE in a future issue. Meanwhile, call 'em up and make 'em feel like family!

And what about all those new ads for PCSG products? Tri-Mike Network East (yours truly) is now licensed exclusively to market and support the entire PCSG line of Model T products and services. (See the NEW PRODUCTS section for details.) There's a lot of excellent software to make your li'l lapwarmer pull ten times its own weight (a slight bit of humor, John), and I want to make sure you all know about it! In fact, I'm gonna give away some valuable stuff just to get you to try it! See any TMN East ad for details.

I'm pleased to welcome a new columnist this month. Gene Wilburn is a terrific writer and a knowledgeable fellow who still feels the magic in the Model 100 family of laptops. He's the perfect one to take new users by the hand and show them around the Model T "neighborhood," tell them what's what and what's where. We're thrilled to have you aboard, Gene, and I promise not to call your MODEL T JOYRIDE column "Mr. Wilburn's Neighborhood" anymore!

We have more good stuff in the works, which you can see in our WORKS IN PROGRESS section on page 36. In addition, we're finally launching the *P100* "Best-Of" project we've wanted to do for so long. Actually, we figured that an "All-Of" collection would serve you even better. We're assembling collections of *all* the printer articles ever run in *P100*, *all* the graphics articles, *all* the M100-to-PC/Mac articles, *all* the reviews, and so on. This will benefit me in that, when asked (for the zillionth time) by the seeker of *P100* wisdom, "How do I connect my Tandy to a Mac?" I can steer him or her to *all the info we've ever published* on the subject. And that will certainly benefit the seeker, too!

Again, for all of this to work, for *P100* to continue putting on weight, to finance the "All-Of" collections, to bring you more of what you want (you will write and tell us, won't you?), you must help. As I said here last month, this is a team effort. We're busting

*Continued on page 36.*

## Toolbox

Manuscripts were typed into Microsoft Word 3.0 on a Tandy 1400 HD, where they were edited, spell-checked, and had basic format instructions inserted. From there they were loaded into a Tandy 4000 (80386 CPU, Tandy EGA Monitor, Tandy LP-1000 LaserPrinter) desktop computer and placed into Aldus' IBM PageMaker 3.01. Once there, design decisions on photo, figure, and listing sizes and placements were made. Here, pull quotes are placed, headlines, intros, and bylines are sized and positioned, and advertisements positioned.

Normally, the Tandy LP-1000 is capable of emulating only a Hewlett Packard Laser Printer Plus, but with the

addition of the Destiny Technology Corporation (300 Montague Expressway, Suite 150, Milpitas, CA 95035. (408) 262-9400) PageStyler 4.5MB kit, the LP-1000 is turned into a fully-compatible PostScript printer, with all 35 native fonts that are found in the Apple LaserWriter Plus printer. The Destiny PageStyler is available through the Tandy Express Order Hardware system.

Page previews were output from the Laserprinter. When everyone was satisfied with the appearance, final pages were output and artwork and lineart ads were positioned. The finished magazine was then delivered to the printer, who printed it, labeled it, and mailed it to you.

## portable 100

**PRESIDENT**  
Terry Kepner

**PUBLISHER**  
Mike Nugent

**EDITORS**  
Terry Kepner  
Mike Nugent

**NEW PRODUCTS EDITOR**  
Linda Tiernan

**CONTRIBUTING EDITORS**  
Paul Globman  
Michael Daigle

**CIRCULATION MANAGER**  
Bob Liddil

**ADVERTISING DIRECTOR**  
Pamela Dass

**BULLETIN BOARD SYSOP**  
Chris Courson

**ELF-PROMOTION**  
Susan Pond

**Portable Computing  
International Corporation**  
145 Grove St. Ext., #21, PO Box 428  
Peterborough, NH 03458-0428  
603-924-9455



**The Portable 100 Bulletin Board**  
603-924-9770  
(300/1200/2400—8, None, 1)

*Portable 100* (ISSN 0888-0131) is published by Portable Computing International Corporation, 145 Grove Street Ext., P.O. Box 428, Peterborough, NH 03458-0428. *Portable 100* is an independent journal not connected with any hardware, software, or peripheral equipment manufacturer. *Portable 100* is published monthly, except for a combined July/August issue in the summer. Entire contents Copyright © 1991 by Portable Computing International Corporation, All Rights Reserved. No part of this publication may be reproduced without written permission from the publisher. Portable Computing International Corporation makes every effort to assure the accuracy of articles published in *Portable 100*, but assumes no responsibility for damages due to errors or omissions. Subscription Service: All subscription correspondence should be addressed to *Portable 100*, Portable Computing International Corporation, 145 Grove Street Ext. P.O. Box 428, Peterborough, NH 03458-0428. U.S. subscription rates: \$19.95, one year; \$34.95 two years. Canada and Mexico: US\$24.95, one year; US\$44.95 two years. All other foreign (surface mail): US\$39.95, one year; US\$74.95 two years. Foreign Air Mail, add US\$50 per subscription year. All payment, except Canada, U.S. funds drawn on U.S. Bank. Second-class postage paid at Peterborough, NH 03458, and at additional mailing offices.

POSTMASTER: Send address changes to: *Portable 100*, Portable Computing International Corporation, 145 Grove Street Ext., PO Box 428, Peterborough, NH 03458-0428.



# WATCHDOG BARKS UP WRONG TREE

I've found an insidious error in my *WatchDog* program (*Portable 100*, May 1989). The program is supposed make sure that the Model T will not become stuck in an endless loop while waiting for a printer or phone line to respond.

The unfriendly side of my watchdog rears its head only on the Tandy 102—never on the Model 100. Wouldn't you know I'd hit on one of the few differences between the two machines!

What happens is that the watchdog runs as described for several trials—maybe two, maybe two hundred. Unpredictably, though, the 102 (never the 100) will lock up. Or worse, it will cold start with total loss of data. Some watchdog, huh? And of course, the disaster will strike during an important show-and-tell, or else out in the middle of nowhere when you aren't looking.

You might never discover the bug. The nature of the program is to sit there doing nothing most of the time, until some other program being "watched" gets stuck. And exactly what happens in the 102 depends on what is in the option ROM socket.

The cause and the solution are simple. The watchdog routine does its stuff by calling the computer's built-in warm start routine. In the Model 100 that routine begins by disabling interrupts. Those are signals from the clock chip, communication line, etc., that can grab the processor's attention. Warm start on the 102 *does not* disable interrupts.

Why the difference? Only the troglodytes at Microsoft know for sure. When you press the reset button on the back of either the 100 or the 102, the hardware itself disables the interrupts. That's the normal way a user of the computer "warm starts" it. No problem there.

But the difference is apparent if you call the warm start routine in software, as does the *WatchDog* program. If an interrupt from the clock chip comes along at the wrong instant, during option ROM check, then the interrupt goes into the option ROM—where there may be no code to handle it. The result depends on exactly what garbage is there where interrupt handling code should be.

The solution for the watchdog ma-

chine language is simply to add a disable interrupt (DI) instruction just before the warm start instruction (RST 0). Here's part of the listing:

```
JNZ EXIT
INX H
INR M
DI ;this is the only change, insert
one instruction
RST 0
EXIT: POP H
POP PSW
.
```

You must also incorporate the change into the BASIC loader I listed in the article. Insert a 243 in line 1050 just after the 35,52 and before the 199. And change the index in line 1010 from *FOR I=1to30* to *FOR I=0to30*. That's all.

Next time, I'll tell how I stumbled onto another difference between the 100

---

*You might never  
discover the bug.*

---

and the 102, the *PRINT USING* bug, and how it got me into trouble!

**Dr. Tracy Allen**  
President, EME Systems  
Berkeley, CA

## MIKE IS RIGHT!

Congrats on Mike Daigle's ESP. My MM ("Magnificent Marjorie,") and I had just about decided, albeit reluctantly, to let our *Portable 100* subscription lapse, when along comes Mike's tantalizingly provocatively titled article, "Know Airs Hear" (*Portable 100*, December 1990).

And he's so right!

As counselors to the young (18 and under) we deal with kids from broken homes, wards of the court, and handi-

capped folks. Sadly—but understandably—they often have poor self images. Early on, MM and I felt we saw many ways for computers to help turn those negative self images into positive ones in a short time.

So in 1981—our TRS-80 Model I, Level 2, with a full 16K. In '83—the large 9-inch screen CP/M Kaypro II, with a monstrous 64K! And "portable," too, at only 26 pounds! Then in '86—a Model 100laptop, upgraded with a Booster Pak, *Ultimate ROM II*, Tandy Portable Disk Drive, and TTX printer. And finally—our PC-AT in '88, with its 60 meg hard drive, 2 floppies, and a \$400 voice board and software.

Each was—and still is—an effective tool.

Remember the artificial psychologist program *ELIZA* in '81? It was astounding how quickly sullen youngsters would interact with *ELIZA*, often revealing helpful clues into their thinking which they'd NEVER show or discuss face to face.

Today it's *EGAROID*s on the AT. The kids play it first, then earn future plays only after they understand—and can say and spell and explain—each syllable of a *Guinness Book of Records* biggie: *pneumonoultramicroscopicsilicovolcanoconiosis*.

Hard? Last year we taught it to 53 of 55 disbelieving (then excited) so-called "special" students in five "special" classes—20 minutes per class! ("Hey, don't you *ever* call me 'stupid' again!")

But Mike is right! Almost \$10,000 and too many years (and hours) later, MM and I feel "maxed out" by the technical. We're simply spending too much time updating ourselves on *Wordstar*, *Sidekick*, and the latest "better than ever" *Procomm*, and deciding whether we even WANT to begin peering into *Windows* and the like!

Mike is RIGHT! The old *Wordstar*, and the old *Procomm*, and the old AT, and the old Model 100 will all have to love each other a little longer. We're shoving twenty bucks of our newly saved loot toward the renewal of our *Portable 100* subscription. Thank you, guys!

**David A. (and "Magnificent Marjorie") Ross**  
Las Vegas, NV



# PostScript<sup>tm</sup> for the LP 1000!

PageStyler...

"See page 36  
in your  
1990 Computer  
Catalog."

DESTINY

Destiny Technology Corp.  
408/262-9400

PostScript is a trademark of Adobe Systems Inc.

Circle 5 on reader service card.

## S-T-R-E-T-C-H your floppy disks with MAXI Disk

Are you tired of running out of space on your MS-DOS floppy disks? MAXI Disk can give you 420k on a 360k drive, 800k on a 720k, 1.4 meg on a 1.2 meg and 1.6 meg on a 1.44 meg. Of course, MAXI also formats normal DOS disks (360/720/1.2/1.44).

\$19.95 (US), \$22.95 (CDN), plus \$2.00 postage & handling from:

Herne Data Systems Ltd., Box 250  
Tiverton, ON, CANADA, N0G 2T0

Voice or FAX (519) 366-2732

Circle 17 on reader service card.

## WP-2 Internal Memory Expansion!

32K RAM — \$12  
128K RAM — *Call for  
best price!*

*Call for 100/102, 200, 600  
memory expansion chip prices*

Purple Computing  
P.O. Box 100  
2048 Southside Rd.  
Murphy, OR 97533  
(800) 732-5012  
Fax (503) 479-8089

Visa and MasterCard accepted.

Circle 49 on reader service card.

### WORTH 1K WORDS

One reason for stepping up my ads (I may have to do more!) is the tremendous response I've gotten from your November 1990 cover photo of the Datapac. Many readers did not know about this product, and I was planning to replace it with the RAMPAC and phase out production of the Datapac. Instead, I find that the orders picked up, and many favor its more permanent attachment and wedge shape design. As a result, we will carry both, with a re-designed (IMPROVED) Datapac.

You have an excellent magazine, which provides a great benefit to us lap-top users and marketers. Keep up the good work.

Ron Alspaugh  
NODE Systems  
Grass Valley, CA

We've all heard that one picture is worth a thousand words (or in computer terms, 1,024 words). You proved it once again, Ron! Even top-flight products like yours can benefit from the—er, exposure—of a photo.

I urge all advertisers to show our readers what they have to offer, because it's not always easy to picture what a product is, or does, from written descriptions alone. It may require a bit more space, but it's almost always worth it.

I'm glad to hear that our trusty Datapac will remain one of the best Model T memory expansions available. Congratulations, and thanks for writing!

-MN

### SOUPED UP AND CIVILIZED

In the December 1988 Portable 100, Michael Heim's article entitled "Taming The 200," outlined how to "soup up and civilize" the Tandy 200.

Since that informative article was published, several new products have become available that enhance the 200 without a lot of extra hardware.

First and foremost, the Tandy 200 would not be half the machine it is today were it not for the programming efforts of Paul Globman. His XOS programs effortlessly link all three banks, as well as enhance the built-in TELCOM program.

Secondly, NODE Systems released a 256K RAM expansion called the RAMPAC. [See ad on page 10] The beauty of this device is that it no longer requires

## We taught it to 53 of 55 disbelieving "special" students.

the use of the option ROM socket (again, thanks to the efforts of Paul Globman). In addition, it is smaller than a pack of cigarettes and attaches to the back of (not under) the computer.

With the option ROM socket freed, owners can now use their favorite option ROM's without conflicts. I have the Ultimate ROM II, and I wouldn't trade it!

We should all be thankful for the hard work and support given to our computers by these people (and that goes for Portable 100, too!). It's a shame that Radio Shack didn't support the Tandy 200. With a little refinement, it's a great machine.

Jim Coston  
New Orleans, LA

### WP2DOS CLARIFICATION

Gene Wilburn's article regarding his WP-2 translation utilities ("TWPKIT for The WP-2," March 1991) mentioned that a Radio Shack null modem cable will work with our WP2DOS program. That is not correct. "Null modem" is like saying "truck." There are several types of trucks. Our null modem cables, called Computer<—>Link cables, include cross-pinning (jumpers) necessary for computer-to-computer timing, to assure error-free block movement between the DOS computer and the WP-2.

WP2DOS is not a "simple" program—not just an ASCII push! Chris De Herrera, author of WP2DOS, did a fantastic job of writing a Tandy Portable Disk Drive emulator via m/l routines embedded into high-level language routines. Timing is critical! Bottom line: Club 100 Computer<—>Link cables do the job and are cost effective.

Just wanted to set the record straight on that one, important fact. Gene's article was well written and a pleasure to read.

Rick Hanson  
Club 100  
Pleasant Hill, CA

### ?IO—CORRECTIONS

Oops! TWPKIT for WP-2/MS-DOS file conversion ("TWPKIT for The WP-2," March '91) is licensed exclusively by Club 100 as part of their WP2DOS package. It is not in the public domain! However, as a courtesy to P100 readers, they've agreed to keep it available on CompuServe and the Portable 100 BBS until May 1, 1991, at which time it will be removed. Sorry for the misunderstanding!

-MN  




Text processing power that no other program can equal.

NOW  
AVAILABLE  
ON  
M-200!

# Write ROM<sup>®</sup>

on Snap-in<sup>™</sup> Cartridge \$99.

**GET IT FREE!**

Of all orders received between  
April 1, 1991 and June 1, 1991,  
one lucky person will have his or  
her full purchase price for this  
item refunded! ORDER TODAY!

**TMNE says "Send it back in 30 days for a full refund  
if you don't agree."**

WRITE ROM is the definitive word processing extension for the Model 100. PCSG produced the first text formatter for the Model 100, now sold by Radio Shack as Scripsit 100. Now, 18 months later, PCSG introduced WRITE ROM. Those who have experienced it say WRITE ROM literally doubles the power of the Model 100.

WRITE ROM — as its name implies — is on a snap-in ROM. You simply open the little compartment on the back of the Model 100 with a quarter and press WRITE ROM in. It's as easy as an Atari game cartridge. You can use other ROM programs like Lucid whenever you wish.

WRITE ROM lets you do every formatting function you'd expect, like setting margins, centering, right justifying and creating headers and footers. But it does them under function key control.

WRITE ROM remembers your favorite format settings so you can print a document without any setup, but you can change any formatting or printing parameter instantly with a function key.

WRITE ROM's "pixel mapping" feature shows you an instant picture on the screen of how your printout will look on paper.

In all there are 64 separate features and functions you can do with WRITE ROM, and some of these features are truly breakthroughs for the Model 100.

First, WRITE ROM lets you do search and replace. Any word or phrase in a document can be searched for and replaced with any other phrase where the search words appear.

Second, WRITE ROM lets you send any text (formatted or not) to any other computer over the phone with just a function key. What's more, it dials and handles sign-on and sign-off protocol automatically.

Third, WRITE ROM has a wonderful feature called Library that lets you record favorite phrases, words or commonly used expressions (often called boilerplate).

Any place you wish Library text to appear you just type a code. WRITE ROM automatically inserts the text just like a Xerox Memory Writer. Picture what you can do with that kind of capability.

WRITE ROM is blindingly fast. No one can claim faster operation. Because it is on ROM, it uses virtually none of your precious RAM. It works with any printer, serial or parallel. You can make a duplicate copy of a document file under a new filename. Rename or delete (kill) any RAM file with function key ease.

This description only scratches the surface of this amazingly powerful piece of software. Dot commands allow control of such things as margins, centering, line spacing and other changes in the middle of a document. Most are WordStar<sup>™</sup> compatible.

A mailmerge feature allows you to send the same document to every name on your mailing list, personalized for each recipient.

WRITE ROM enables you to do underlining, boldface and correspondence mode as well as any other font feature like superscripts that your printer supports, in a way that many users say "is worth the price of the program."

To underline you don't have to remember a complicated printer code. You just type CODE u, and to stop underline, CODE u again. The CODE key is to the right of your spacebar. Boldface? CODE b to start and stop. Easy to remember and do. Five different printer features of your choice.

We couldn't list all the features here. For example, you can select not just double space but triple or any other. You can use your TAB

key in a document. WRITE ROM allows you to indent. This means you can have paragraphs with a first line projecting to the left of the rest of the paragraph. WRITE ROM has a feature unique for any word processor on any computer. It's called FORM. FORM is an interactive mechanism that lets you create screen prompts so that you or someone else can answer them to fill out forms or questionnaires.

With FORM, any place that you had previously typed a GRAPH T and a prompt in a document, WRITE ROM will stop and show you at prompt on the screen. You can type in directly on the screen and when you press F8 you see the next prompt. It goes to a printer or a RAM file.

Think how you can use FORM. A doctor or nurse could use it for a patient's history with each question appearing on the screen. An insurance salesman could use it for his entire questionnaire. You could construct a series of prompts to answer correspondence, typing the answers, even using Library codes. This feature lets you answer letters in rapid-fire fashion, each with personalized or standard responses.

Before WRITE ROM you had to be a programmer to create a series of prompts. Now it's as simple as GRAPH T.

PCSG makes the claim that WRITE ROM is the easiest, fastest and most feature-rich formatter for the Model 100. We're happy to offer WRITE ROM because it expands the 100 to a dimension of text processing you cannot equal on even larger computers.

We brashly state that WRITE ROM is the best you can buy. But put that to the test. If you aren't as excited as we are, return it for a full refund. Priced at \$99. on snap-in ROM. MasterCard, VISA, American Express and COD.

Distributed by:

**Tri-Mike Network East**

P.O. Box 372, Peterborough, NH 03458

1 (603)

924-8663

VISA / MASTER CARD / AM. EXP. / C.O.D.

Circle 71 on reader service card.

Another fine product from the innovative people at PCSG!





# Zen and The Art of Motorcycle Madness

## (Or: More Thoughts About Less ...)

I just bought a new motorcycle. Well, new for me anyway. It's a black '82 Yamaha Virago, a big 750 V-twin cruiser with shaft drive. It's low and heavy and very fast.

Ron, the original owner, had bought it brand new a few years ago. He got it with the optional touring package: several hundred dollars of factory fiberglass fairing, saddlebags, and trunk. This made the bike perfect for long, long rides. Only thing is, Ron probably never rode it farther than 100 miles from home in all the time he had it.

So why pay all that extra money? Why put up, day in and day out, with all that extra weight? Why bother, when there was no advantage to it?

Well, I think that there *was* an advantage to it for Ron. I think it allowed him to enjoy the *idea* of being a tourer. I think he enjoyed the potential of it, the romance of it, the assumption other people made, as he rode up, that he was a stranger from a distant place. Just passin' through, ma'am.

I think he enjoyed the illusion.

In the town I live in, there are stores that rent computer software. Many of my friends who have IBM computers frequent these stores almost obsessively. On the average, these guys are normal Joes, blue collar workers or white collar low- to mid-level management. Their computing needs are pretty simple. So what would you suppose they rent? Games? Nope. Educational programs? Uh-uh.

They rent *WordPerfect*. *Windows*. *Excel*. *Corel Draw*. *Ventura Publisher*.

In short, they rent what are commonly known as the "best" (read: most powerful) software on the planet. Do they need them? No, they don't. Will they use them? No. But they'll install

these programs on their hard drives, they'll list them on their system menus, and they'll even replace them with the newest upgrades the minute they become available.

They'll never have the need for programs this powerful. They'll never have the time (or the self-discipline) to spend weeks or months learning the intricacies of each program. But when they fire up their systems and read the menu, they'll be able to tell themselves that their system is a powerful, state-of-the-art per-

---

*I can tell the client  
is a little skeptical.*

---

sonal workstation. They like the potential of being able to use all that software.

They like the illusion.

There's nothing wrong with that. We all use illusion to buffer ourselves from life's rough edges. But sometimes it's good to do a little spring cleaning of your illusion closet, a little introspection to make sure that the illusions are serving you, and not vice versa. And the first step is to understand just what your illusions are.

It's not always comfortable.

Take me, for instance. For the last few years, I've made a living in part by writing ad copy for businesses. I have always

done this on a computer. And in this traditionally PC-dominated domain, I have marched to a different beat by using my Model T, my Tandy 102. I have to admit, I have always enjoyed the reaction I get.

For example, a restaurant: Inside, the client waits with Bruce, who runs a freelance desktop publishing bureau and often farms the writing out to me. I pull up on the motorcycle, go inside, and meet the client, helmet in one hand, leather backpack in the other. I can tell the client is a little skeptical. And that skepticism only grows when I open the backpack, pull out the Model T, and begin taking notes on this strange little machine that (let's face it) looks a little like the unholy offspring from some unnatural mating between a PC and a Nintendo.

But ...

At our next meeting, the client sees the end result. And he/she loves it. I'm happy to say they almost always do. And I smile, put the Model T in the backpack, throw a leg over the motorcycle and ride off into the sunset, leaving a grateful client, hardcopy in hand, shaking his/her head in wonder and asking Bruce, "Who *was* that masked man?"

Reality buffed to a high gloss with the wax of illusion. The Model T has worked well for me over the years. But the illusion that I can call all the shots and use whatever tools I want to is starting to catch up with me.

A couple of years ago, the raw materials I worked from were usually the client's previous brochures or a few pages of hand written or typed notes. But more and more often lately, the raw material comes to me on a disk. A PC disk. And if I don't plug that disk into a

Continued on page. 11.



# IBM Character Graphics on The Model T

(With a little help from your printer!)

by Bill Gerber

I remember seeing them used in IBM manuals in the late 1950's, but the origin of the graphic characters comprising the "upper" ASCII character set in many contemporary printers seems to be lost in antiquity. After searching high and low, even inquiring through multiple levels of a major US computer corporation, I've found no one who knows anything useful about them. In fact, I've found only a few people who are even aware of their existence.

Can anyone enlighten us as to who invented these characters, the circumstances by which they came about, their originally intended purpose, and what additional uses innovative people have made of them? Are there, for example, sets of "macros" available that would let one print the "happy face" character, a composite logo (e.g., FIDO!), or even the components of electrical circuit diagrams, by using combinations of characters from the full upper and lower ASCII character set?

Perhaps we should conduct a contest among *Portable 100* readers to see who can come up with the most innovative applications or the most elaborate graphic art using the full character set? [Go to it, readers! Meantime, we'll think up a prize for the best!—Ed.]

Whatever their origin, the graphic character set available on many printers can provide Model 100/102/200 (hereinafter referred to as "Model T") users with at least rudimentary graphics capability. The "framework" in Figure 2 provides a simple example of what can be done with these characters on Epson-compatible (IBM) printers.

So how come no one seems to use them? To begin with, the designers of the Model T and its ROM-based software seem to have gone out of their way to make it difficult to use the graphics set.

Screen Character	Keyboard Character	Decimal	Printed Character	Screen Character	Keyboard Character	Decimal	Printed Character
✓	(CODE) 7	176	✓	À	(CODE) Q	216	À
À	(CODE) A	177	À	Í	(CODE) K	217	Í
Ó	(CODE) O	178	Ó	Ô	(CODE) L	218	Ô
Ù	(CODE) U	179	Ù	Û	(CODE) J	219	Û
€	(CODE) 6	180	€	Ý	(CODE) Y	220	Ý
-	(CODE) I	181	-	Ü	(CODE) <	221	Ü
à	(CODE) a	182	à	É	(CODE) V	222	É
ó	(CODE) o	183	ó	À	(CODE) X	223	À
ù	(CODE) u	184	ù	(CODE) Z		224	(CODE) Z
B	(CODE) S	185	B	■ (upper left)	(CODE) I	225	■ (upper left)
Ì	(CODE) T	186	Ì	■ (upper right)	(CODE) Ì	226	■ (upper right)
é	(CODE) d	187	é	■ (lower left)	(CODE) #	227	■ (lower left)
ú	(CODE) .	188	ú	■ (lower right)	(CODE) \$	228	■ (lower right)
ë	(CODE) v	189	ë	■	(CODE) %	229	■
-	(CODE) =	190	-	■	(CODE) ^	230	■
ƒ	(CODE) F	191	ƒ	— (upper)	(CODE) Q	231	— (upper)
á	(CODE) I	192	á	— (lower)	(CODE) W	232	— (lower)
â	(CODE) 3	193	â	(left)	(CODE) E	233	(left)
í	(CODE) 8	194	í	(right)	(CODE) R	234	(right)
ô	(CODE) 9	195	ô	⌘	(CODE) A	235	⌘
û	(CODE) 7	196	û	⌘	(CODE) S	236	⌘
-	(CODE) -	197	-	⌘	(CODE) D	237	⌘
ä	(CODE) e	198	ä	⌘	(CODE) F	238	⌘
ı	(CODE) I	199	ı	⌘	(CODE) X	239	⌘
â	(CODE) q	200	â	r	(CODE) U	240	r
ı	(CODE) k	201	ı	—	(CODE) P	241	—
ó	(CODE) I	202	ó	ı	(CODE) O	242	ı
ú	(CODE) j	203	ú	T	(CODE) I	243	T
ý	(CODE) y	204	ý	ı	(CODE) J	244	ı
ñ	(CODE) n	205	ñ		(CODE) :	245	
â	(CODE) z	206	â	L	(CODE) M	246	L
ó	(CODE) .	207	ó	J	(CODE) >	247	J
À	(CODE) I	208	À	⌞	(CODE) <	248	⌞
É	(CODE) #	209	É	ı	(CODE) L	249	ı
ı	(CODE) ^	210	ı	+	(CODE) K	250	+
Ô	(CODE) (	211	Ô	✓	(CODE) H	251	✓
Û	(CODE) &	212	Û	▲	(CODE) T	252	▲
ı	(CODE) I	213	ı	▼	(CODE) G	253	▼
É	(CODE) E	214	É	⌘	(CODE) Y	254	⌘
É	(CODE) D	215	É	⌘	(CODE) C	255	⌘

Figure 1. Comparison of Model T "upper" ASCII character set and their ASCII equivalents printed by standard Epson-compatible (IBM) printers.



## TANDY WP-2 MEMORY

128K \$74

32K \$17

Improve your memory! Add a 32K or 128K ram disk to your WP-2. The 32K part is exactly the same as Tandy's at a significantly lower price. The 128K part has the same low-power characteristics of the 32K part. Battery life is not a problem! Prices include S&H, installation instructions, 90-day warranty. CA residents add 6.25% tax. Send check or money order to:

**MicroMime**

P.O. Box 28181

Santa Ana, CA 92729

CIS 70346,1267

MCI 200-3496

Fax (714) 545-1765

Circle 37 on reader service card.

There are no markings on the keyboard to indicate which keys to press to get specific graphic characters; the set of graphic characters in the Model T ROM is only a portion of the full set incorporated into the printers; and even this subset is displaced in terms of the ASCII value of each of the characters provided in the Model T, compared to the corresponding values used in the printers. So, "it ain't easy" to use them.

### MAKE IT EASY ON YOURSELF

But the task can be made easier if you're willing to take the time to make yourself a table. And *just maybe*, the information in this article will provide you

**If you get  
a one-for-one  
correspondence,  
you're "in clover."**

with what you need. This assumes that the graphic characters in your printer, and their ASCII values, are the same as those in my printer. There's reason to hope that this will be so—I have two printers, each having modes that emulate functional components of two other printers, and all of these modes place the graphic characters in the same order and at the same ASCII values. But this is not universal; I once had still another printer that provided graphic characters but didn't follow this psuedo-standard.

## Make more use of memory

### Put your Model 102/200 programs on an Option ROM

Putting programs on an Option Rom provides greater security for your programs, will often increase program speed, and will allow you to make better use of your programs memory for storing data rather than programs. Ideal for business, Police, and data collection applications. We provide a complete range of products and services to help you get the most from your laptop computer. Call us for:

- Cross development systems that let you convert programs developed on a PC in Assembler, Basic or "C" and download them onto an Eprom.
- Eproms, Burners, Erasers, and Eprom Adapters (including solderless and socketed development adapters.)
- Putting your program on a ROM.
- Eprom Burning and soldering services. Consulting.

For information on products or services call  
King Computer Services, Inc.

1016 N. New Hampshire,

Los Angeles, CA 90029.

(213) 661-2063

**Your one stop shop for all  
your Option Rom needs**

**CALL TODAY**

### Current Special 50% off The Secrets of ROM Revealed

Concise, easy to understand manual covers previously undocumented features of the Model 100/102 Option Rom in detail. Includes listings of everything needed to call standard Rom Routines from a Rom and IBM floppy with source code of key routines and a search & replace utility for Text Files. \$25.00 Add \$3.50 shipping.

Circle 116 on reader service card.

#### GRAPHICS FOR THE MODEL 100/102 AND TANDY 200

With a little help from your printer?

GRAPHIC COMPONENT	SINGLE LINES	PRNTD CHARS	SNGL U DBL H	PRNTD CHARS	DBL U SNGL H	PRNTD CHARS	DOUBLE LINES	PRNTD CHARS
<b>CORNERS</b> Up Left Up Right Lo Left Lo Right	Code L Code F Code 1 Code K	r l J	Code I Code F Code & Code =	F L J	Code E Code o Code < Code v	r l J	Code k Code d Code q Code ,	F L J
<b>LINEs</b> Hrztntl Urtcl	Code U Code 7	 -	Code U Code n	 =	Code T Code -	 =	Code T Code n	 =
<b>"TEEs"</b> Top Left Center Right Bottom	Code 8 Code 9 Code - Grph 6 Code 3	       	Code # Code e Code Q Code I Code .	       	Code * Code i Code D Code a Code !	       	Code j Code y Code z Code S Code l	       

Figure 2. Model T keystrokes required to produce IBM graphics characters on printer.



# CHARACTER GRAPHICS

To see if you can use the contents of Figure 1 directly, compare the information presented in Figure 2 with the table of upper ASCII characters for your printer. If you get a one-for-one correspondence, you're "in clover." Otherwise, you'll need to make a table similar to Figure 2 but using the appropriate tech data for your own printer. (See the *ASCII Character Code* tables in the appendices of your Model T manual.) The key to comparing the table, or making a new one, is to match the decimal (or hex) value of each character with the decimal (or hex) value of the corresponding Model T CODE and GRPH characters.

If it's not already obvious, I should caution you: When you go to create a printer graphic, what appears on your Model T screen will differ from what your printer will print! For example, the character my printer interprets as a double vertical line (produced by pressing CODE-T) appears as the trademark symbol (a T above an M) on my Model T screen. Figure 2 shows the characters that will appear on your screen, together with the characters that my printer prints. Note that in the whole set of Model T keystrokes, there is only one GRPH combination, GRPH-6; all others are CODE combinations.

M-100/102-T-200 GC											
L	r	I	F	E	r	k	F				
f	l	u	e	o	l	d	f				
1	l	&	=	<	u	q	,				
K	J	=	=	=	=	=	=				
U		T		7	-	n	=				
8		#	=	*		j					
9		e	=	i		y					
-		q	=	D		z					
•6		L	=	a		S					
3		.	=	!		l					

Figure 3. "Cheat sheet" for translating Model T keystrokes to produce IBM graphics on your printer. Keep a photocopy of this with your Model T (maybe inside the battery compartment cover) for easy, quick reference.

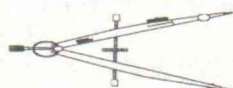
Now that you understand the general scheme of things, Figure 3 is a "cheat-sheet" version of Figure 1, sized for copying and placing somewhere (like inside the Model T's battery compartment door) for easy reference. The one GRPH character (GRPH-6) is highlighted to remind you why nothing happens when you press CODE-6.

## HINTS AND KINKS

When generating printouts wider than the 40-character width of the Model T screen, the effort can become very confusing. You may find it useful to first map out the work on quadrille-ruled paper and then transfer the pattern, line by line, to the Model T. On the other hand, if your table will be less than 80 characters in width, you might be able to use a program like *View 80* (on the *Ultimate ROM II*) to keep each printable line on one screen line, thereby avoiding the confusion that arises from word-wrap.

Another hint: When printing material that includes vertical lines, you may get straighter lines by putting your printer into a unidirectional print mode (see your printer manual for details). Another fluke to watch out for: If you use *WRITE* in *Super ROM*, *CODE-u*, *e*, and *i* (used to command underline, emphasized, and italic, respectively) can cause some initially puzzling results.

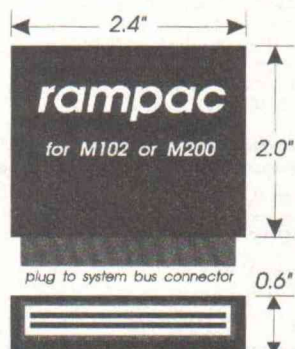
Additional capabilities can be developed using the upper ASCII character set. For mathematicians and statisticians, a capability could be developed to write mathematical or statistical notations. The approach to develop this capability should be almost identical to that used to develop the graphics capability described above.



## by design.....

The only **REAL DEAL** for RAM expansion!

Add our rugged cartridges to your TANDY laptop and you have a combination which is truly portable, easier on your pocketbook and **DOES THE JOB!** The



RAMPAC, which is diagrammed on the left offers easy changeability and small size. Any number of RAMPACs can be shared with any number of Model 102 or 200's. A built-in 3+ year lithium battery (Duracell DL 2430) is user replaceable and protects data whether plugged into the laptop or not. Guaranteed the most cost effective RAM, the RAMPAC for the M102 or M200 sells for **\$129** in the 128K size and **\$169** for the 256K size. The DATAPAC, which is diagrammed below, is securely fastened underneath and to the back of the laptop with Velcro™. The DATAPAC is more permanently attached than the RAMPAC and its

wedge shape acts as "prop" legs for easier display viewing. It has been recently redesigned to double its former capacity and has a slimmer housing. The DATAPAC is available for the M100 or M102 only. Contact NODE for M200 information. It is

priced at **\$179** for 128K, **\$219** for 256K, **\$259** for 384K, and **\$299** for 512K. All prices include one copy of RAM disk software,

one year warranty, 20 day satisfaction guarantee and UPS (or US mail certified) air shipment in the continental U.S. The RAM disk software, by Paul Globman, uses 1.4K of main RAM, can coexist with ALL option ROM's and displays a single directory bank (two banks for 512K) with over 500 files possible. All file types (.CO, .DO, .BA) are easily and rapidly transferred between main RAM, freeing it for larger documents and programs. For BASIC programmers, special calls allow automated file operations and multi-program "chaining".

for info or to order, CALL: 1-916-477-9148, FAX: 1-916-273-7519



**node**

P.O. BOX 1534  
Grass Valley, CA 95945

Circle 41 on reader service card.



# Portable 100 BACK ISSUES

With over 60 issues, and hundreds of articles, *Portable 100* is THE source for information, programs, and applications for your Tandy Portable Computer. But how do you find what you need among all those issues? The answer is the **updated Portable 100 Article Index**. Covering every issue from September 1983 to the combined summer 1989 issue, the index is designed to make it simple for you to find what you need. And at a cost of only \$9.00 (postage and handling included), you should buy one today! If you have last year's index, don't despair. Update your index by adding our special 1988-1989 Update Index. It's a bargain at just \$4 (P&H included).

And what do you do when you find an article you want? Easy. First check the back issue chart below for back issue availability. If the issue is available, just order it using the handy order form (\$5.00 each, postage and handling included). If it isn't, don't despair. Photocopies of any article in a sold-out issue cost just \$2.50 each. Simply list the article, or articles, by title, author, and issue, enclose payment, and in just a short time you'll have the articles in hand.

Month	83	84	85	86	87	88	89	90
January			Not Published					
February								
March			OUT		Not Published			
April		OUT						
May		OUT				OUT		
June		OUT						
July		OUT		OUT		combined July/August	combined July/August & Sept. (Summer 1989)	Not Published
August		OUT						
September	Premier Issue					OUT		
October		OUT		Not Published				
November								
December						OUT		

- ☐ Send me the 1983-Summer 1989 *Portable 100 Article Index* for \$9.00 (Postage & Handling included).
- ☐ Send me the Sept. 1988-Summer 1989 *Portable 100 Update Article Index* for \$4.00 (P&H included).
- ☐ Please send me the back issues I've indicated (\$5.00 each; shipping & handling charges included).

## PAYMENT MUST ACCOMPANY ORDER

- ☐ CHECK OR M.O. ☐ MC ☐ AMEX
- ☐ VISA TOTAL ENCLOSED \_\_\_\_\_

CARD# \_\_\_\_\_ (Be sure to include entire card number) EXP. DATE \_\_\_\_\_

NAME \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Please allow six to eight weeks for delivery

Portable 100, Back Issue Department, P.O. Box 428, Peterborough, NH 03458

Continued from page 7.

PC, I have to retype all that text into the Model T to manipulate it. I can't bill for that time, because the client provided the disk so I wouldn't have to key in the data in the first place. And when the job is done, the client expects my copy both as printouts and disk files. PC files.

Now it's true, I can use some superb tools like *LapDOS* to keep my PC and Model T talking and working together, and I have done that often in the past. But it complicates my life rather than simplifies it, and when that happens, it's time to stop and reevaluate.

In the past, I didn't have a lot of choice. The hassle of shuffling work in and out of the Model T was the price I had to—and was willing to—pay in exchange for the portability that was so important to me. But that's changed now.

For one thing, I have more clients. That means less extra time. For another, more of them are using PC's. Compatibility becomes more of an issue. And, most importantly, the Model T is no longer the only game in town for me.

As I mentioned last month, I am now the owner of an 1100 FD, Tandy's low-end PC laptop computer. I had tried to live with a WP-2 for a little while, but for reasons I won't bore you with here, I

found that I just couldn't use it for my purposes. Meanwhile, Tandy had dropped the price so much on the 1100 FD that, despite my initial dislike of the machine, I couldn't resist. So I bought one.

*Sometimes  
less is more.  
Sometimes  
less is less.*

And I fell in love. Sometimes, first impressions can be wrong. My first impressions of the 1100 FD were not good, but—as detailed in last month's column—spending some time with the machine has shown me the errors of my ways.

So here I am, as always, with the need for portability and with a small computer that meets those needs. But, for the

first time, that computer isn't my beloved Model T.

So what of the motorcycle? Well, I pulled the big factory fairing and replaced it with a small handlebar mounted windshield. I tossed the trunk and sidebags and replaced them with a gym bag and a pair of bungee cords. Now the bike handles as well as it runs.

Sometimes less is more.

And as for the computers? Well, I've parked the Model T, its future in my life uncertain at this point. Much as I hate to say it, the 1100 FD may be the better choice for what I'm doing now.

Sometimes less is less.

And to those among you who think I've sold out, that I've done a 180 and deliberately decided to complicate my life: you're mistaken. I've come to the 1100 because it simplifies a process that I must engage in more and more often. In the months to come, I will still be trying to find the most Zen-like solutions to my needs. The machine may be different, but the goal remains the same.

Sometimes the path to enlightenment is the path of least resistance.

-by Michael Daigle





## COMPATIBILITY:

Model 100, 102, and 200 (Tandy 200—see editor's note).

# Homebrew Model T Custom Graphics

*Create and print your own logos, letterheads, and other works of art!*

*by Robert H. Pigford*

**H**ave you ever wished you could design your own distinctive logo for your letterhead? Design special forms? Create and print any type of custom graphics on your "Model T" laptop? Well, you can!

SKETCH.BA and GRAFIX.CO will release the Rembrandt within you. Working together, they let you edit LCD screen pixels dot-by-dot, save those screen images to files, and retrieve them at any time for re-editing or printing. What's more, they give a choice of 12 sizes of screen dumps on Epson 9-pin or compatible printers.

The GRAFIX.CO program is called by SKETCH.BA as a way of providing graphics screen prints in any of 12 different height and width combinations. The 1-wide by 1-high printout is great for printing a small logo at the top of a page with a letterhead. The 4-wide by 4-high printout will almost fill the paper and is great for printing scientific graphs.

## GETTING STARTED

Run LDGRFX.BA (Listing 2) to create the GRAFIX.CO program. LDGRFX.BA asks you to choose where in memory GRAFIX.CO will always load and run. If you don't want it directly under the current HIMEM, choose a starting address low enough that the required 2,807 bytes of memory won't conflict with any other machine language program you may wish to have active at the same time (such as a disk operating system). When the loading is complete, you are offered two user-determined configuration choices:

1. *Want Linefeeds sent to your printer upon printouts <Y/N>?* Some people set their printer to automatically throw in a linefeed every time it sees a carriage return. If so, then choose N. If you want the program to supply the

needed linefeeds, choose Y.

2. *Set printer line spacing value.* Most Epson-compatible printers use 24 (actually 24/180-inch). Printers using other values for their graphics vertical line spacing include the Gemini-10X, which uses 16. If you don't know about your printer, use the default value of 24 and see if the printouts have spaces or overlaps in the print.

You may now kill LDGRFX.BA after first saving it to tape or disk. If you later decide to change these values or wish GRAFIX to operate at a different address,

## Your picture file will unfold on the screen.

you will have to run LDGRFX.BA again. SKETCH.BA is designed to find GRAFIX.CO in RAM and extract the CALL addresses it needs prior to running. Screen image files made with previous versions of GRAFIX.CO will be compatible with the new version.

## RUNNING THE PROGRAM

Run the SKETCH.BA (Listing 1) program. At the first menu, press ENTER to continue with loading of GRAFIX.CO into high memory. The HIMEM value

TERRY KEPNER'S

**portable 100**

Drawn with SKT200.BA  
and GRF200.CO (c) 1991,  
by Robert H. Pigford

*A sample of what you can do with your Model T and SKETCH.BA, done with our Tandy 200 and Tandy LP-1000 laser printer in Epson-compatible (IBM) mode.*

will be set automatically. At the program's main menu, choose I for instructions. After reading these, choose N to create a new picture. The dot will start at the upper left corner. The spacebar toggles the dot on and off, and you move the dot around with the keypad directors. The computer's embedded numeric keypad keys form the eight directional keys to move the dots around:

```
& * (
u   o
j k l
```

When ready to save or print the screen contents, press the / key to bring up the GRAFIX choices on line 8 of the picture. You may then choose one of the following:

<Q>uit returns you to editing where you left off

<P>rint will prompt you for your choices of height multiple, then width multiple desired. When the width choice is entered, the printout begins. If it doesn't, check that your printer may be off-line. If so, put it on-line to begin.



## T-200 Enhancement

XOS (Cross bank Operating System) will enhance your Tandy 200 and allow the three banks to share programs and data. XOS will bring a new level of computer functionality at the MENU, from BASIC, TEXT, and TELCOM.

From the Tandy 200 MENU you will be able to enter memos, rename files, set alarms, display and run programs that are in other banks, and much more.

Cut TEXT from one bank and PASTE it to a file in another bank. Open a "window" while editing in bank #1, and view other files from bank #2. Disable "word wrap" while editing for another perspective of your TEXT file.

While on-line with TELCOM, display FILES and Bytes Free, enter and edit TEXT files, or jump to another RAM bank without losing the host computer connection.

BASIC programs can read/write to files in other banks. Jump to programs in other banks or bring the program into the current bank and run it.

XOS provides fundamental database entry and retrieval functions with user defined fields, prompts, and display parameters. A bargain at

**\$24.95**

## Node Datapac Users Replace your ROM!!

RAMDSK.CO will replace the Node ROM and allow you to use one of those other ROMs you've always wanted. Retain all of the Node menu functions, plus the ability to move, kill, and name Datapac files under program control. A MUST for Node Datapac owners who have other option ROMs. RAMDSK.CO is available for the M100/M102 and T200... only

**\$24.95**

N-READ.CO will allow a BASIC program to read a TEXT file stored in the Datapac without moving the file into RAM. An absolute necessity for multi-file database projects where the datafiles are kept in the Datapac. N-READ.CO is only \$9.95 but is yours for \$5 when ordering RAMDSK.CO.

## For Your Amusement...

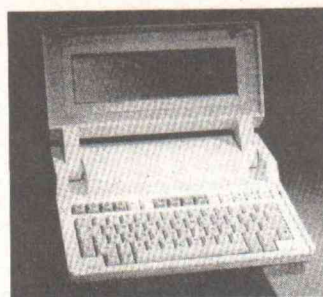
A beguiling PUZZLE/GAME program for your Tandy 200. A logical challenge that will keep you busy for many hours. Only \$10.00 for PUZZLE #3. Order with XOS or RAMDSK.CO and I'll send three additional puzzle/game/maze programs for your Tandy 200, at NO EXTRA CHARGE.

Software shipped on PDD1 (100K) diskette. All prices include shipping. Send your order with check or M.O. to:

**Paul Globman**

**9406 NW 48th St., Sunrise, FL 33351**

Circle 121 on reader service card.



Hewlett-Packard's HP110 Portable

## PORTABLE POWERHOUSE

~~(\$3000 original retail)~~

**ONLY \$495!**

**(\$795 with portable printer and disk drive)**

**Includes word processor, Lotus 1A, built-in modem, communications software—and a ONE-YEAR GUARANTEE!**

Hewlett-Packard's HP110 Portable was way ahead of its time.

An MS-DOS machine (version 2.11), the HP110 stores programs and data on ROM chips. The rugged unit weighs only 8 pounds, has a 16-line screen, and has enough available memory for more than 80 pages of word processing text.

With up to 20 hours of continuous use per battery charge, the HP110 is ideal for business travel.

At only \$495 used, our HP110s make great gifts for students, friends, and spouse. **Note:** With most other com-

puters, used means worn out. But there's little that can wear out in an HP110, because there are no moving parts except for the keys.

Every HP110 we sell is fully tested and is **guaranteed against malfunction for one full year.** All units come with a **30-day no-risk trial and free technical support.** For details or to order, call (800) 373-6114. Call now—offer good only while supply lasts!

**ALSO:**

**Like-new Portable Plus: only \$1295!**  
(original retail: \$2795)  
**Used: \$895**



**Personalized Software INC.**

*The worldwide HP Portable experts*

P.O. Box 869, Fairfield, IA 52556 (515) 472-6330 FAX: (515) 472-1879

We also publish the HP Portable newsletter, and offer more than 100 software programs that make the HP110 and Portable Plus even more powerful.

Circle 39 on reader service card.

<S>ave to make a save. When GRAFIX completes a screen scan, it clears the screen and asks you to <1> choose a file name for saving (it creates a 1,920-byte .CO file of the image), <2> return to editing the same sketch, or <3> return to the program's main menu. Choosing <3> will ERASE your picture, so be sure to save your work first! Using the same file name as an existing file name will overwrite the old copy. Make frequent saves, and even change file names if you wish to save different copies of the same picture. When saving is complete, you are left in BASIC. Press F4 to run SKETCH again, or F8 to exit to the Model 100 main menu.

To work on an old file, or to get it on the screen so you can print it, choose E at the SKETCH main menu. When asked for a file name, enter the name of your picture file in RAM (don't use the extension). If SKETCH.BA can't find it, it will tell you. If found, your picture file will unfold onto the screen and leave you in dot editing mode. Toggle the dot on/off with the spacebar to help locate it.

## NOTES AND HINTS

Use the CTRL-arrow keys, then the D combination as a quick way to draw lines, borders, etc.

SHIFT-arrows moves the dot 16 pixels at a time up/down and 12 pixels left/right, so if started from an edge, it can be helpful in choosing where to place text (text characters are eight dots high by six dots wide).

When using the Draw function, the second D can be cancelled by hitting CTRL-D.

The Text function is also handy for making selective erasures. Just put the dot near where you wish to erase, hit T, then

*Continued on page 15.*

```

10 'SKETCH.BA (c) 1989 by R.H.Pigford
15 'last upgrade 1/27/91
20 'uses GRAFIX.CO (c) 1989 R.H.Pigford
25 GOTO290
30 A$=INKEY$:IFA$="" THEN30ELSERETURN
35 'pixel editing
40 CLS
45 D=1
50 A$=INKEY$
55 IFA$=>"a" THENIFA$<="z" THENA$=CHR$(ASC(A$)AND223)
60 IFA$=CHR$(32) THEND=1-D:GOTO175
65 IFA$=CHR$(85) THENX=X-1:GOTO175'U
70 IFA$=CHR$(1) THENX=X-12:GOTO175's-lft
75 IFA$=CHR$(79) THENX=X+1:GOTO175'o
80 IFA$=CHR$(6) THENX=X+12:GOTO175's-rt
85 IFA$=CHR$(56) THENY=Y-1:GOTO175'8
90 IFA$=CHR$(20) THENY=Y-16:GOTO175's-up
95 IFA$=CHR$(75) THENY=Y+1:GOTO175'K
100 IFA$=CHR$(2) THENY=Y+16:GOTO175's-dn
105 IFA$=CHR$(55) THENX=X-1:Y=Y-1:GOTO175'7
110 IFA$=CHR$(57) THENX=X+1:Y=Y-1:GOTO175'9
115 IFA$=CHR$(74) THENX=X-1:Y=Y+1:GOTO175'J
120 IFA$=CHR$(76) THENX=X+1:Y=Y+1:GOTO175'L

```

*Continued.*

Listing 1. SKETCH.BA lets you create, edit, save, retrieve, and print custom graphics on Epson-compatible printers.



## Int/Ext's for Laptops/Desktops

- ♦ INTERNAL 20MB & 40MB Hard Drives for Tandy 1400's \$599 & \$859
- ♦ EXTERNAL 20MB AND 40MB Hard Drives for Tandy 1400's \$495 & \$695
- ♦ EXTERNAL 5.25" Floppy Drives for Tandy 1400's \$199
- ♦ Call for more details Toll free USA and Canada **1-800-544-4252**
- ♦ EXTERNAL "BACKPACK" FLOPPY DRIVE 1.2MB/1.44MB/2.88MB for any Tandy \$369 & \$299 with parallel port interface
- ♦ POCKET MODEM 2400 baud \$119
- ♦ POCKET FAX/MODEM \$299 9600bd send/rec fax 2400bd modem
- Micro Sense, 370 Andrew, Leucadia, CA 92024

Circle 29 on reader service card.

```

125 IFA$=CHR$(17) THEN X=0:GOTO175'ctrl+l f
t arrow
130 IFA$=CHR$(18) THEN X=239:GOTO175'ctrl+
rt arrow
135 IFA$=CHR$(23) THEN Y=0:GOTO175'ctrl+up
arrow
140 IFA$=CHR$(26) THEN Y=63:GOTO175'ctrl+d
n arrow
145 IFA$="T" OR A$="t" THEN SOUND1000,2:GOTO
210
150 IFA$="D" THEN 545
155 IFFD=1 THEN GOSUB 570
160 IFA$=CHR$(4) THEN SOUND15000,2:FD=0
165 IFA$="/" THEN 270
170 IFA$=CHR$(27) THEN 335
175 IF X<0 THEN X=0
180 IF X>239 THEN X=239
185 IF Y<0 THEN Y=0
190 IF Y>63 THEN Y=63
195 IFD=1 THEN PSET(X,Y) ELSE PRESET(X,Y)
200 GOTO 50 'loop back
205 'find cursor position
210 C=INT(X/6):R=INT(Y/8):L=(R*40)+C
215 L1=L'save first curs vals
220 L$=INKEY$:IF L$="" THEN 220
225 IFL$=CHR$(13) THEN SOUND5000,2:GOTO50
230 IFL$<>CHR$(8) THEN 250
235 IFL>319 THEN L=319:GOTO245
240 L=L-1:IF L<L1 THEN L=L1
245 PRINT@L," ";:GOTO220
250 IFL>319 THEN 220
255 PRINT@L,L$;:L=L+1
260 GOTO220
265 'go to GRAFIX.CO
270 CALL GF 'start of GRAFIX
275 IF PEEK(PF)=0 THEN 440'prflag
280 GOTO 50
285 'intro and menu for SKETCH.BA
290 GOSUB800:CLR100,GF:E$=CHR$(27):CLS
295 GOSUB800:GOSUB700
300 PRINT@125," "E$"pENTER"E$"q key to c
ontinue or...":LINE(35,31)-(35,23),1:LIN
E-(65,23),1
305 PRINT@205," "E$"pQ"E$"quit":LINE(35,
47)-(35,39),1:LINE-(41,39)
310 GOSUB300:IF A$="Q" OR A$="q" THEN MENU
315 IFA$<>CHR$(13) THEN 310
320 ON ERROR GOTO330:LOADM"GRAFIX":GOSUB8
00
325 E$=CHR$(27):GOTO 335
    
```

## PIXEL GRAPHICS

```

330 CLS:BEEP:PRINT"Could NOT loadm "E$"p
GRAFIX.CO "E$"q!":PRINT"Hit <"E$"pANY"E
$"q> key!";:GOSUB300:MENU
335 PRINT E$;"W";' enable scroling
340 CLS:GOSUB700:PRINT@40,"<Q>uit":PRINT
@55,"<I>nstructions"
345 PRINT@80,"<N>ew Sketch":PRINT@95,"<E
>dit EXIST.CO file.":LINE(0,7)-(239,7),1
350 LINE(2,30)-(235,63),1,B:LINE(76,20)-
(85,20),1:LINE-(85,30),1:LINE(216,20)-(2
25,20),1:LINE-(225,30),1
355 PRINT@161,E$"p/"E$"q Screen SAVE + M
ultiple PRINT Functs."
360 PRINT@201,E$"pT"E$"q Type TEXT at do
t then "E$"pENTER"E$"q"
365 PRINT@241,E$"pD"E$"q Set 1st dot, "E
$"pD"E$"q DRAW LINE to 2nd dot."
370 PRINT@281,E$"pESC"E$"q Erase picture
and return here.":LINE(5,32)-(5,63),1
375 A$="":GOSUB300:A=INSTR("QqIiNnEe",A$)
:IFA=0 THEN 375 ELSE ON(A+1)/2 GOTO380,585,38
5,395
380 MENU
385 PRINT E$;"V";:GOTO40'no scroll
390 'look for existing Ram .CO filename
then pass it's start addr to GRAFIX
395 CLS:FILES:PRINT"Enter your existing
PIX.CO ":PRINT"filename (w/o ext.).":IN
PUTS I$:IF LEN(SI$)=0 THEN BEEP:GOTO335
400 L=LEN(SI$):IF L>6 THEN BEEP:GOTO335
405 N$=SI$:GOSUB500:SI$=N$
410 PRINT E$+CHR$(M);:SI$=SI$+".CO"
415 PRINTSI$+" Correct? <Y/N>"
420 GOSUB300:IFA$="N" OR A$="n" THEN 395
425 GOSUB900:IF NF=1 THEN 335
430 CALL FZ,,DS 'pass the RAM start Addr
to HL register- FILLCD:
435 PRINT E$;"V";:GOTO 45
440 CLS:PRINT"<1> Save Buffer to RAM Fil
e."
445 PRINT"<2> Return to EDITING Sketch."
450 PRINT"<3> Go to Main Menu (lose this
sketch). "
455 GOSUB300:A=VAL(A$):IFA<1 OR A>3 THEN BEEP
:GOTO455 ELSE ON A GOTO465,460,335
460 CALL FZ,,BS:PRINT E$;"V";:GOTO45
465 CLS:FILES:PRINT"Save Sketch File";:I
NPUTS N$:N$=N$:GOSUB500
470 SN$=N$:PRINTSN$+" ".CO";
475 PRINT" Correct? <Y/N>":GOSUB300:IFA$=
"N" OR A$="n" THEN 465
480 SX$=SN$:T=0:T=INSTR(SX$,"."):IF T THEN
SN$=LEFT$(SX$,T-1) ELSE SN$=SX$
485 ON ERROR GOTO 500
490 PRINT"Hit <F4> -> SKETCH or <F8> ->
MENU."
495 SAVEMS N$,BS,BE-1,0 'dumps to BASIC
500 BEEP:PRINT"RAM FULL! ... returning E
DITING.":GOTO 440
505 A$="":B$="":C$="" 'capitalize
510 FOR W=1 TO LEN(N$):B$=MID$(N$,W,1)
515 B=ASC(B$)
520 IF(B>96) AND (B<123) THEN C$=CHR$(AS
C(B$) AND 223):GOTO530
    
```

Continued.



## Play Games on Your Laptop!

Adtron's Top Flight game port card for the Tandy 1400LT:

- lets you connect a joystick to your laptop
- operates with all games and software that use the IBM® standard game port
- employs low power circuitry that's easy on batteries
- costs just \$95
- makes a great gift!

Prototyping board also available.

### ADTRON Corporation

745 N. Gilbert Road  
Suite 124-361  
Gilbert, Arizona 85234  
602/940-0060

Circle 21 on reader service card.

*Continued from page 13.*

use the spacebar to print spaces over the graphics. Once erased this way, however, the dot graphics are gone. You will have to redraw them if wanted (or edit your recently saved RAM file again). If you hit *T* and then change your mind, just hit *ENTER* to finish and get back to dot editing without having put any text over the graphics.

Using *SHIFT-GRPH-X* in the Text mode can quickly fill the screen with full characters of all dots.

*GRAPHX.CO* does not reset all the printer settings, so when finished you will not have to reset your margins, bold, etc. Hitting *SHIFT-BREAK* while printing will return control to the *M100* program, but your printer may then be locked in graphics mode requiring you to turn it off to completely clear it.

To conserve RAM, you can shorten the *SKETCH.BA* program as follows:

1. Edit out the instructions (just change line 585 to *BEEP:GOTO335* and delete lines 590-695).
2. Remove the *LINE* commands (but not from line 555).
3. Edit out all remarks and all lines that contain only remarks.

Have fun!

*Robert Pigford holds a BS degree in Mechanical Engineering, is a Registered Professional Engineer in two states, and does automatic control system engineering for a major global chemical company. Although he uses many "more powerful" computers at work, he still enjoys the simple, powerful, and overall more productive M100/102/200 family, and finds programming them such a nice break from all that MS-DOS hype.*

*Editor's note: For space reasons, only the Model 100/102 BASIC listings appear here. These programs, assembly language source code, and Tandy 200 versions of these programs are all available on CompuServe's Model 100 Forum, our Portable 100 BBS (see masthead for telephone number and TELCOM stats), and on this month's P100-To-Go disk.—MN*



## NEW TANDY 1400LT PRODUCTS

- ★ 20 MB INTERNAL HARD DRIVE
- ★ 5.25" EXTERNAL FLOPPY DRIVE
- ★ NUMERIC KEYPAD
- ★ INTERNAL 2400 BAUD MODEM

EXTERNAL DRIVES FOR ZENITH, TOSHIBA, NEC,  
SHARP, & DATAVUE ALSO AVAILABLE

FOR INFORMATION CALL

## COMPUTER OPTIONS UNLIMITED

**201-469-7678**

Fast, dependable service  
Open 7 days 9am-10pm EST  
World Wide Sales

Circle 148 on reader service card.

```

525 C$=B$
530 A$=A$+C$
535 NEXTW:N$=A$:RETURN
540 'record points, draw/erase line
545 IFFD=0 THEN X1=X:Y1=Y:FD=1:SOUND1047,2
:GOTO50
550 X2=X:Y2=Y
555 IFD=1 THEN LINE(X1,Y1)-(X2,Y2),1 ELSE LINE(X1,Y1)-(X2,Y2),0
560 FD=0:FB=0:SOUND1760,2:GOTO50
565 'make the DRAW or BOX anchor pixel flash
570 IFZ=0 THEN PRESET(X1,Y1) ELSE PSET(X1,Y1)
575 Z=1-Z:RETURN
580 'instructions
585 CLS:GOSUB705:PRINT@40,"A drawing program, using the keys"
590 PRINT"forming the keypad for the
& * ("
595 PRINT"dot drawing directions. Toggle U O"
600 PRINT"the dot on/off with the J K L"
605 PRINT"p space bar "E$q. Combine Shift+ARROWS"
610 PRINT"to jump 16 dot's, and use Cntrl+ARROWS"
615 PRINT"to move to edges.
---more>";:LINE(201,13)-(236,41),1,B:GOSUB30

```

*Continued.*



## AFFORDABLE HARD DRIVES FOR YOUR LAPTOP

THE NEW  
QUICKBRICK  
is here!



Toshiba, Tandy, IBM Convertible  
NEC, Sharp, Kaypro, Dataview,  
Zenith — you name it. Prices start at  
\$495 for 20 Mb.

**Systems Peripherals Consultants**  
7950 Silverton Ave., #107  
San Diego, CA 92126  
619/693-8611

Circle 18 on reader service card.

## TANDY 600 MEMORY \$129

We make the 96K memory expansion boards that fit inside your Tandy 600 Portable. You can expand your 600 yourself to 224K with two boards. Complete installation instructions, 90-day warranty, and 30-day money-back guarantee. We also make memory for the Model 100, 102, and 200.

**Purple Computing**  
P.O. Box 100  
2048 Southside Rd.  
Murphy, OR 97533  
(800) 732-5012

Visa and MasterCard accepted.

Circle 55 on reader service card.

## USED LAPTOPS!

MODEL 100—24 K	\$ 235.00
MODEL 100—32K	\$ 255.00
MODEL 102-32K	\$ 315.00
MODEL 200	\$ 375.00
MODEL 600—24K	\$ 325.00
TANDY 1400LT—2 Dr.	\$ 665.00
TANDY 1100FD 1Dr.	\$ 535.00
WP-2 WORD PROCESSOR	\$ 245.00
PORTABLE DISK DRIVE	\$ 95.00
SOFTWARE & MEMORY CHIPS	\$ CALL
TANDY TRP 100 PORT. PRINTER	\$ 115.00
TANDY DMP 105 PRINTER	\$ 65.00
BROTHER PORTABLE PRINTER	\$ 65.00

**Buy, Sell and Trade**  
Tandy Equipment  
**503 236-2949**

**Pacific Computer Exchange**  
1031 S.E. Mill St. Suite # B, Portland, OR 97214

Circle 45 on reader service card.

```

620 CLS:PRINT"With the dot on a normal c
haracter"
625 PRINT"location, hit "E$"pT"E$"q to i
nitiate TEXT on"
630 PRINT"screen. Use "E$"pENTER"E$"q w
hen done."
635 PRINT"Use "E$"pD"E$"q once to set an
chor point for"
640 PRINT"a line. Move, hit "E$"pD"E$"q
again to DRAW line."
645 PRINT"If the second dot is 'off', th
e line"
650 PRINT"will erase. Cancel 2nd "E$"pD
"E$"q with Ctrl-D."
655 PRINT"With your SKETCH on screen,
----more>";GOSUB30
660 CLS:PRINT"<ESC> = erase sketch, go t
o Main Menu."
665 PRINT"</> to bring up the "E$"p GRAF
IX "E$"q options : "
670 PRINT" <P>rint screen. Choose from
12 "
675 PRINT"    possible Width/Height comb
inations."
680 PRINT" <S> Scans screen, asks SAVE
filename?"
685 PRINT"    Dumps to BASIC. Use F4 to
RUN again.";
690 PRINT" <Q>uit = return to SKETCH ed
iting."
695 PRINT"That's all.          Any Key ->
MAIN MENU";GOSUB30:GOTO 335
700 PRINT@41,"Newark, DEL. Uses Himem"GF
"to"BE;
705 PRINT@0," "E$"pSKETCH.BA"E$"q & "E$"
pGRAFIX.CO"E$"q "CHR$(171)"1989 R.H.Pigf
ord"
710 LINE(77,0)-(77,7),1:LINE(5,0)-(5,7),
1
715 RETURN
795 'find appropriate address values
800 SI$="GRAFIX.CO":GOSUB900
805 IF NF=1THENEND
    
```

```

810 GF=PEEK(DS+3)+256*PEEK(DS+4)'start G
RAFIX.CO
815 PF=PEEK(DS+5)+256*PEEK(DS+6)'PRFLAG:
addr.
820 BS=PEEK(DS+7)+256*PEEK(DS+8)'BUFFER:
start addr
825 BE=PEEK(DS+9)+256*PEEK(DS+10)'end
830 FZ=PEEK(DS+11)+256*PEEK(DS+12)'FILLC
D
835 CLS:RETURN
895 'get FILE.CO addr references
900 SS$=" "
905 SP$=SI$:T=INSTR(SP$,"."):IFTTHENSF$=
LEFT$(SP$,T-1)
910 SP$=SP$+SS$
915 SP$=LEFT$(SP$,6):FORD=63919T064128ST
EP11:T=PEEK(D)
920 IFT=160ANDPEEK(D+3)=ASC(SP$)THENFORI
=2T06:IFPEEK(D+2+I)=ASC(MID$(SP$,I))THEN
NEXTI:DS=256*PEEK(D+2)+PEEK(D+1):SP$=SP$
+" .CO":NF=0:GOTO935
925 NEXTD:SP$=SP$+" .CO":PRINTSP$+" NOT F
OUND!";:BEEP:FORD=1T0300:NEXTT:NF=1:GOTO
940
930 'get appropriate RAM addr of .CO fil
e and pass to GRAFIX.CO
935 DS=DS+6 'move to actual file data
940 RETURN
    
```

End of listing 1.

```

0 'LDGRFX.BA loads GRAFIX.CO -> 100/102
5 '(c) 1989, R. H. Pigford, Newark, DE
10 'Loader style learned from DIRACC.BA
15 'by S. Burgoyne & H. Ferreyra
20 GOTO 35
25 Z=1-Z:PRINT@193,CHR$(229+Z);:RETURN
30 A$=INKEY$:IFA$=""THEN30ELSERETURN
    
```

Continued.

Listing 2. LDGRFX.BA creates the GRAFIX.CO program used by SKETCH.BA.



## The Beginner's Guide to the WP-2

A 26-page booklet that tells you everything you need to know about the WP-2—what it can do, what it can't do, and how to use it with tape cassette, disk drive, and other computers. It even includes the cable instructions for connecting it to Macintosh and IBM-compatible computers! If you own a WP-2, or are thinking of buying one, then you must have this book! Order today!

**Only \$9.95 (plus \$1.00 S&H)**

Portable 100-WP-2 Booklet, POB 428,  
Peterborough, NH 03458  
Visa, MC, & AMEX accepted

Circle 13 on reader service card.

## ROMBO

At last! An economical adapter that allows you to use stock EPROMs (27C256) in the option ROM socket in the Tandy models 100/102/200. They're reuseable too, no soldering necessary. Remove an EPROM in seconds, reprogram, and reinstall in the same ROMBO. "The best!"

**ROMBO:** \$9 ea (1-9) \$8 ea (10 up).  
**27C256 EPROM:** \$6.50 ea.  
plus \$3 per order for shipping.

(Need a ROM emulator? See our extRAM ad.)



**eme systems**

voice: (415) 848-5725

fax: (415) 848-5748

2229 5th St., Berkeley, CA 94710

Circle 81 on reader service card.

## Multisolutions...\$50

Model 200 ROM with database,  
wordprocessing, appointment  
calendar & expense tracking

## Multiplan...\$35

Spreadsheet ROM for model 100

Send check or money order to:

**Robert Rice**  
**PO Box 53798**  
**Houston, TX 77052-3798**

Add \$3 postage & handling. Texas  
residents add 7.25% sales tax. Send  
for our model 100 & model 200  
software catalog.

Circle 151 on reader service card.

```

35 CLS:PRINT"Loader for "CHR$(27)+"p GRA
FIX.CO "CHR$(27)+"q (2807 bytes).":PRINT
@44,CHR$(171)" 1989 R. H. Pigford, Newar
k, DE"
40 PRINT"<1> load just below HIMEM."
45 PRINT"<2> load at ANY address."
50 PRINT"<3> QUIT."
55 GOSUB30:X=VAL(A$):IFX<10RX>3THEN55ELS
EONXGOTO65,75,60
60 MENU
65 AD=HIMEM:CLEAR256,AD-2807:SA=HIMEM
70 PRINT>Loading under old HIMEM.:GOTO9
0
75 INPUT"Start Address ";SA
80 IF SA<32768ORSA>60150THENBEEP:GOTO35
85 CLEAR 256,SA:SA=HIMEM
90 PRINT>Loading from "SA"to"SA+2807
95 D$="0123456789ABCDEF"
100 M=SA
105 A=SA:FOR J= 1 TO 60
110 READ LN$:FOR I=1 TO LEN(LN$) STEP 2
115 C1=INSTR(1,D$,MID$(LN$,I,1))-1*16
120 C2=INSTR(1,D$,MID$(LN$,I+1,1))-1
125 POKE A,C1+C2:A=A+1:NEXTI:M=M+(LEN(LN
$)/2):PRINT@270,M;:GOSUB25:NEXT J
130 'poke in adjusted CALL addresses
135 PRINT@310,"ADJUSTING";
140 FOR I=1 TO 124
145 READ C,R
150 HI=INT((SA+R)/256):LO=(SA+R)-HI*256
155 POKE (SA+C),LO:POKE (SA+C+1),HI
160 GOSUB25:NEXTI
165 'poke in buffer RET values
170 PRINT@310,STRING$(9," ");:FOR X=1 TO
1920:POKE (SA+886+X),210:GOSUB25:M=M+1:
PRINT@270,M;:NEXTX:BEEP
175 'adjust optional features
180 LF$="Y":L=24:N$="GRAFIX"
185 CLS:PRINT "Toggle "CHR$(27)+"p GRAFI
X.CO "CHR$(27)+"q options then save."
190 PRINT@40,"CODE now loaded:"SA" - "(S
A+2800)
195 PRINT@80,"<1> Send Linefeed with CR

```

```

(Y/N)..":PRINT@115,LF$
200 PRINT@120,"<2> Value for Linespacing
.....":PRINT@154,L
205 PRINT:PRINT@200,"<3> Create "CHR$(27
)"p "N$+"CO "CHR$(27)"q"
210 GOSUB 30:A=VAL(A$):IFA<10RA>3THEN195
ELSEONAGOTO 215,235,250
215 'toggle LF or NO LF decision
220 IFLF$="Y"THENLF$="N":GOTO230
225 IFLF$="N"THENLF$="Y"
230 GOTO195
235 'line increment value for printer
240 CLS:PRINT"Check your printer manual.
":PRINT" Epson uses 24":PRINT" Gemini
10x uses 16":PRINT" Diconix (DIP #5 = 0
) uses 24":PRINT" HP Quietjet (DIP #5 u
p) uses 24"
245 INPUT"Value for line spacing increme
nt";L:GOTO185
250 'POKE values of options then SAVE
255 IF LF$="N" THEN 260 ELSE 265
260 FOR I=SA+795 TO (SA+795+4):POKE I,0:
NEXTI
265 'poke linespacing value
270 POKE (SA+751),L
275 'save and return to main menu
290 PRINT"Any key to SAVEM "CHR$(34)N$CH
R$(34);:GOSUB30
295 SAVEM N$,SA,SA+2807-1,SA
300 END
305 'hex vals assembled from GRAFIX.DO
310 DATA"C303EBF6EA7AEC6DEEDF573EB3E01
315 DATA"327AEC210801CD42EDCDA1EB2138EB
320 DATA"CDA211CD96EBCDE80FFE50CAABEBFE
325 DATA"53CA60EBFE51CA2FEB317EBCD5BEE
330 DATA"1E38CD60EDC91B704752414649581B
335 DATA"7120AB524850203C503E72696E7420
340 DATA"3C533E617665202E2E3C513E756974
345 DATA"00CD5BEE1E38CD60ED3E00327AEC21
350 DATA"0101C3FAEB226BEE3E05327AEC1100
355 DATA"0915C8D5CD60ED11F0002A6BEE1922
360 DATA"6BEED17BC6085FC37EEBB7CD4272CA
365 DATA"96EBCDE80FC9210801CD7C42CD5D42

```

Continued on page 20.



# Club 100 More than just a laptop user group

Look to Club 100 for the largest selection of performance products to make you a laptop power user. Call today!

## ☐ Lapdos II

Turn your Model 100/102/200/NEC8201 into a PC-partner. Connect your laptop computer or Tandy Portable Disk Drive directly to MS-DOS computers for file transfers at 19200 baud. Fast! Easy to use. Single or batch file transfers at the press of a button. Feature rich!!  
(Computer<-->Link Cable required)

## ☐ WP2DOS

Turn your WP2 into a PC-partner. The only "file transfer" and "file conversion" software available for WP2 to DOS computer owners. Online utilities convert WP2 .DO files to popular DOS word processing file formats ... maintains file formatting codes. Super easy and fast. (Computer<-->Link Cable required)



## ☐ Computer<-->Link Cables

Custom-built cables specifically developed for use with Lapdos II and WP2DOS. More than a simple "null-modem" cable.



## ☐ 100duet

Turn your Model 100/102 into a Mac-partner. Connect your laptop computer or Tandy Portable Disk Drive directly to Macintosh computers for file transfers at 19200 baud. Fast! Easy to use. Single or batch file transfers at the press of a button. Automatic file translations allow your Mac programs to use your laptop files, directly!

## ☐ LOADER

Add-on connection program enables Model 200 and NEC8201 owners to use 100duet.



## ☐ WPduet

Turn your WP2 into a Mac-partner. Connect your laptop computer or Tandy Portable Disk Drive directly to Macintosh computers for file transfers at 19200 baud. Fast! Easy to use. Single or batch file transfers at the press of a button. Automatic file translations allow your Mac programs to use your laptop files, directly! Maintains file formatting codes.

## ☐ The Ultimate ROM II

Four programs in one make this more than just a "super" ROM. T-WORD: overwrite/insert mode while editing, imbed print controls, control print output (margins, line spacing, page feeds, headers, footers, auto page numbering, bold face, underline, italics, mail merge, labels, and more), pixel-plot view of document before printing. T-BASE: true relational base operations, key field sorts, math, report generation, etc. IDEA!: outliner program for concept development. View80: see up to 60 characters per line while in TEXT, TELCOM and BASIC, fast processing, easy to read. TS-DOS link: automatically loads and runs TS-DOS from disk without conflicts (requires TS-DOS on disk, sold separately).



## ☐ TS-DOS on disk

Super fast, easy access to your TPDD or TPDD2. Available for Models 100/102/200 and NEC8201. Features: file tagging, file printing direct from disk or RAM, direct access to disk drive from within BASIC or TEXT. Use by itself or with the Ultimate ROM II or other ROMs



## ☐ TS-DOS on ROM

When all you need is disk access without using RAM. Super fast, easy access to your TPDD or TPDD2. Available for Models 100/102/200 and NEC8201. Features: file tagging, file printing direct from disk or RAM, direct access to disk drive from within BASIC or TEXT. ROM version includes file compression in RAM. Program runs from ROM - uses no RAM! Simple and powerful.





## □ ROM2/Cleuseau

The very best programming tools available for Model 100/102/200 and NEC8201 laptop programmers. Two ROMs in one, and more. ROM2 is a full functioned 8085 macro assembler. Cleuseau adds much needed features to BASIC and TEXT. Call for full details. Feature rich!!



## □ Power Pillow

Good-looking, powerful, long-lasting battery pack encased within an attractive black-vinyl holder provides hundreds of hours of battery life. Attaches to the back/bottom of your laptop with velcro (included). Hand crafted and tested. (Requires 4, "D" cell batteries, not included)

## □ Keyboard Bands

Just the right size dental rubber bands necessary to almost eliminate Model 100/102/200 keyboard noise. Great for library and meeting use. Easy to install. Instructions included.

## □ Quick Reference Card

Don't leave home without this handy three-fold card, containing all the functions for Model 100/102 use. Includes a listing of BASIC, TEXT commands and TELCOM settings.

## □ KONEXX

The hottest, new line-attachment for going online though office PBX and hotel phones. Does not require a dedicated line. Active electronics provide much more than simple switching. Attaches, in-line, between the phone handset and the base. Includes clips for hard-wired base-to-handset found in most hotels. Small size - fits in pocket.



## □ RAM EXPANSION

your Model 100/102/200/WP2 computer's RAM. RAM chips, RAM expansion modules and WP2 RAM disks available. (M100: 8K RAM chips, 64K and 96K RAM Exp Banks) - (M102: 8K RAM, 128K and 256K RAM Exp Banks) - (M200: 24K RAM banks) - (WP2: 128K RAM disk) Call for multi-chip pricing.

## □ FREE BBS

Our free-2-use bulletin board computer is available 24 hours a day. Features: free public conference, free classified advertising, free laptop reference material, free newsletter, free downloads, product ordering, assistance, and more. Log on with any computer. Simple menus fit all 40 character, 8 line displays. Fast, interrupt drive, easy to use for beginners. Friendly. No online cost. Unlimited online time. PC Pursuitable! Unlimited online library access \$1 a month.



## □ Program Collections

We have the largest "quality" collection of public domain, shareware and author-specific programs available for Model 100/102/200 users, i.e., text, print, telcom, business, graphics, drives, utilities, games, music, programming, education. Available online or mail order on disk. Listings available.



Ask about our monthly Special\$...

Call Today



415 932-8856



# Club 100

PO Box 23438, Pleasant Hill, CA 94523

Voice 415/932-8856 / FAX 937-5039 / BBS 939-1246

Circle 164 on reader service card.



## Used Laptops

**We Buy, Sell & Horsetrade**

### Popular Computers

Model 100 .....	\$275.
Model 102 .....	325.
Model 200 .....	325.
Model 600 .....	400.
Disk-video I'face .....	115.
Disk Drives .....	Call
MS-DOS .....	Call
Apple & IBM Parts .....	Call

**Shreve Systems**

2421 Malcolm St.  
Shreveport, LA 71108  
318-635-1121  
FAX 318-742-2799

## Four Model 100 Books!

☆ **The Model 100 Program Book** by Terry Kepner and David Huntress. 51 useful BASIC programs for home, office, and education: bar graph, depreciation, annuity, pie chart, forms creation, invaders game, memory scan, touch typing tutor and many others—\$19.95.

☆ **60 Business Applications Programs** for the TRS-80 Model 100 Computer by Terry Kepner and Mark Robinson. 60 powerful programs for interest calculations, annuities, depreciation, invoices, breakeven sales analysis, and more—\$21.95.

☆ **Inside the Model 100** by Carl Oppedahl "...an excellent Guide"—New York Times. A thorough guide to the Tandy Model 100. Learn about A.L. programming; disassembled ROM routines; keyboard scanning; UART, RS-232C, and modem; Clock/calendar chip; Interrupt handling; 8085 instruction set—\$24.95.

☆ **User Guide and Applications for the TRS-80 Model 100 Portable Computer** by Steven Schwartz. 14 ready-to-run programs for business: statistics, graphics, sound, and more. With cassette tape—\$44.95. Buy them separately—the book is only \$21.95; the cassette tape is only \$27.00.

**Granite Street Portables**

**P.O. Box 651**

**Peterborough, NH 03458**

*Please allow six to eight weeks for delivery.*

## WEETAX™ The Weekly Tax Program

For periodic maintenance of input to your personal income tax return.

- table-driven panel fields
- your labels and default data
- optional, prompted annotation
- year-to-date summary printout
- resets to start next year
- only 377 bytes reside in RAM
- standardizes format
- promotes time management
- provides current accounting
- avoids the year-end crisis
- keeps you in control

DVI: \$44.95 ppd PDD: \$49.95 ppd for Ultrasoft Disk Power™ 100

Prices include 12-month support.

Software Versand, Points West No. 158  
3131 W. Cochise Dr., Phoenix, AZ 85051  
Phone: 602-997-1523 © 1989 TMO

Circle 20 on reader service card.

Circle 30 on reader service card.

Circle 128 on reader service card.

Continued from page 17.

```

370 DATA "C9CDA1EB2121ECCDA211CD96EBFE31
375 DATA "FAB4EBFE33CAB4EBFE35F2B4EBD630
380 DATA "327AECDDA1EB213EECCDA211CD96EB
385 DATA "FE31FAD4EBFE35F2D4EBD630327BEC
390 DATA "CD5CECCD5BEE1E38CD60ED210101CD
395 DATA "DAEDDA41EECD42EDE53A7AECA7CA14
400 DATA "ECFE01CA8AECFE02CAA4ECFE04CA00
405 DATA "EDE12C3E09BDCA41EE2601C3FAEB50
410 DATA "727420484549474854206D756C7469
415 DATA "706C653F203C312C322C343E005072
420 DATA "74205749445448206D756C7469706C
425 DATA "653F203C312C322C332C343E003A7B
430 DATA "EC47110300217EEC7EB8CA6FEC19C3
435 DATA "66EC23E327CEC237E327DECC90101
440 DATA "000001F00002E00103D00204C003CD
445 DATA "EAED1EF0216DEE7ECD17EEDA37EE23
450 DATA "1DC292ECCD0CEEC314EC06021680CD
455 DATA "EAED1EF0216DEE0E007EA2C4ECEC7A
460 DATA "0F577EA2C4F1EC7A0F577EA2C4F6EC
465 DATA "7A0F577EA2C4FBEC7A0707075779CD
470 DATA "17EEDA37EE231DC2B0ECCD0CEE1608
475 DATA "05C2A8ECC314EC79F6C04FC979F630
480 DATA "4FC979F60C4FC979F6034FC9060416
485 DATA "80CDEAED1EF0216DEE0E007EA2C438
490 DATA "ED7A0F577EA2C43DED7A075779CD17
495 DATA "EEDA37EE231DC20CEDCD0CEE7A0F0F
500 DATA "5705C204EDC314EC79F6F04FC979F6
505 DATA "0F4FC9CD5BEECD4942CD7C42F5CD2B
510 DATA "EEF1E5CD97EDE1243E29BCC248EDCD
515 DATA "4E42C906800E0016002A6BEE0C79FE
520 DATA "09C8E57EA0D5C5C28BEDCA91EDC1D1
525 DATA "E123147AFEF0C26EED780F471CC364
530 DATA "EDCD4C74C379EDCD4D74C379ED21EB
535 DATA "FF2C7E2FCDB5EDE5CDACEDE17DFEF1
540 DATA "C29AEDC92A6BEE7723226BEEC9471E
545 DATA "080E00CDBFED79C978CDCFED780F47
550 DATA "79074F1D7BC2BFEDC9E601C4D5EDC9
555 DATA "79F6804FC93E1BCD3F6D3E33CD3F6D
560 DATA "3E18CD3F6DC93E1BCD3F6D3E4CCD3F
565 DATA "6D3A7CECCD3F6D3A7DECCD3F6DC93E
570 DATA "1BCD3F6D3E32CD3F6DC93E0DCD3F6D
575 DATA "3E0ACD3F6DC9A7C5E5217BEC46E1CD

```

```

580 DATA "3F6D05CA29EEC31FEEC1C93EFF00000
585 DATA "0000003DC8C32DEEE1CD2942CD2942
590 DATA "C303EB3A7AECA7CA54EECD01EECD29
595 DATA "42CD4E42C303EBCD2942CD2942C9E5
600 DATA "3A7AECA7CA69EE216DEE226BEEE1C9
605 DATA "00000
610 'adjustable address values
615 DATA 1,13,3,0,5,388,7,887,9,2807
620 DATA 11,125,16,388,22,588,25,171
625 DATA 28,66,34,160,42,181,47,106,52
630 DATA 57,55,33,58,869,63,618,107,869
635 DATA 112,618,117,388,123,260,126
640 DATA 885,131,388,140,618,146,885
645 DATA 150,885,158,136,165,160,182
650 DATA 171,185,299,191,160,196,190
655 DATA 201,190,206,190,211,388,214
660 DATA 171,217,328,223,160,228,222
665 DATA 233,222,238,389,241,358,244
670 DATA 869,249,618,255,740,258,843
675 DATA 261,588,265,388,269,286,274
680 DATA 404,279,430,284,522,292,843
685 DATA 297,260,359,389,366,392,371
690 DATA 377,375,368,380,390,385,391
695 DATA 405,756,410,887,414,801,417
700 DATA 833,422,412,425,790,428,286
705 DATA 435,756,440,887,447,502,455
710 DATA 507,463,512,471,517,480,801
715 DATA 483,833,488,442,491,790,497
720 DATA 434,500,286,527,756,532,887
725 DATA 539,578,547,583,554,801,557
730 DATA 833,562,534,565,790,573,526
735 DATA 576,286,589,869,599,821,604
740 DATA 673,612,594,625,885,638,661
745 DATA 641,667,652,632,659,622,665
750 DATA 643,671,643,680,703,684,694
755 DATA 691,676,695,885,700,885,709
760 DATA 713,715,729,726,713,732,735
765 DATA 767,390,773,391,805,389,814
770 DATA 819,817,809,831,823,841,13,844
775 DATA 388,848,862,851,779,860,13,871
780 DATA 388,875,883,878,887,881,885

```

End of listing 2.



COMPATIBILITY: Model 100, 102, and 200 (sometimes others, with changes).

# Machine Language Programming Tips

*Make your programs smaller, faster, and safer.*

*by Paul Globman*

I believe that over time, most assembly language programmers develop their own handy little routines to do one thing or another. I would like to share a couple of tips that I often use, which will save a few bytes in your program, and make your program run faster and safer.

## M/L TIP #1

Assembly language programs must leave no stones unturned, and the programmer is responsible for considering every possibility that the program might encounter. This includes errors, subroutine redirection, and stack manipulation.

The Model 100 ROM operating system is very capable of managing free RAM, allocating file buffers for BASIC programs, and maintaining the computer's "stack area." Most assembly language programs assume that the stack is properly positioned and make no attempt to alter or relocate the stack.

This is common and not incorrect in the Model 100 environment, but depending upon the program, the stack could become larger than expected, and run into an area of memory that should not be used. Here's an example of how this could happen... consider this program...

```
begin: call display
      call get_input
      call function
      jmp begin
```

Now suppose you are in the middle of the *function* routine, and you discover the input is not valid. You wish to send the user a beep, and start over again. Since you got to the *function* routine via a *CALL*, the stack is holding the return address of the call. So a simple beep and return will not restart the program, and a

beep with a *JMP BEGIN* will leave the stack with the previous *CALL*'s return address still on the stack.

You could have an error routine and *JMP ERROR*. The error routine could pop the unwanted address off the stack, BEEP and *JMP BEGIN*, for example...

```
error: pop h
      call beep
      jmp begin
```

This type of error trap is okay, but the *POP H* instruction requires that *ERROR* should only be jumped to when only one *CALL* instruction has been executed.

## Assembly language programs must leave no stones unturned.

Very often programmers write all their routines as subroutines. So routine #1 will call routine #2, which calls routine #3, which encounters an error. Now the above *ERROR* routine will not solve the problem of keeping the stack balanced ("balanced" means a *RETURN* for every *CALL* and a *POP* for every *PUSH*). If this happens frequently in a program, the stack pointer can quickly run down into an area of memory containing data or programs, and cause program malfunction, destroyed files and programs, or

even cold starts.

Here's how to ensure stack balancing, regardless of how many nested *CALL*s, or unmatched *PUSH*es you have executed. You can break out to an error routine without concern of stack pointer housekeeping.

```
start: lxi h,0
      dad sp
      shld begin+1
;
begin: lxi sp,0
      call display
      call get_input
      call function
      jmp begin
;
error: call beep
      jmp begin
```

By executing the three instructions before *BEGIN*, you ensure that every time you *JMP BEGIN* the stack pointer is reset. This is done by making the first instruction of *BEGIN* restore the stack pointer to its original value. You can *JMP ERROR* (or *JMP BEGIN*) at any time without concern about *CALL*s, *PUSH*es, or stack balancing.

I would also point out that this technique can be used more than once within a single program, thus restoring the *SP* register to what it should be at different parts of the program. This will allow the program to freely abort subroutines when necessary, and spare the programmer the need to write special "housekeeping" code for each aborted subroutine.

## M/L TIP #2

Very often the assembly language programmer will use *DB* and *DW* state-

Continued on page 32.



# Through the (8-Line by 80-Column) Looking Glass

*Here's a new monthly column  
to help you get the most from your WP-2!*

*by Stan "Skateboard in Wonderland" Wong*

**I**t was a dark and stormy night. A scream pierced the night. It was obvious. The butler did it! Case closed.

I leaned back in my chair to contemplate the words I'd just written, softly glowing at me from the screen of my WP-2. Yes, sir, my great American novel was beginning to take shape. The phone rang. It was Nuge advising me that I was late with my new WP-2 column.

This column, F1/F2, is a new feature devoted to Tandy's WP-2 Portable Wordprocessor. Those of you familiar with my other work in *Portable 100* may wonder why a techno-nerd like me is writing about a word processor. Well, I own one and I use it a lot. In fact, I use it more than my Model 100. That and my propensity toward verbosity make me well qualified to write this column.

Each month, we'll explore the capabilities and mysteries of the WP-2 (like figuring out what happened to the WP-1!). I intend to focus on the WP-2 as a tool. There will be a lot of basic "how-to" articles, such as what to do with the machine right out of the box. The hacker within me, though, can't resist occasionally devoting a few words to some of the esoteric technology lurking within that sexy, sleek black case.

Here are some of the topics we'll cover:

- Hooking up a printer
- Document formatting
- Embedded printer codes
- Editing tricks and traps
- Embedded formatting for PC word processors
- Memory expansions
- Disk and tape storage
- Using the scheduler
- Using the dialer
- Hooking up a modem

- Portable modems
- "Big Iron" connectivity
- WP-2 programming
- Tutorials
- And lots more!

Computers are great. You can make them do anything you want. But the emphasis is on *you*. You have to set them up and configure them to do your bidding. You could think of them as blank canvases upon which you color, with a spreadsheet here, a word processor there, and a splash of utilities. The WP-2,

---

**You can move a  
whole paragraph  
with your  
electronic "scissors  
and paste."**

---

on the other hand, is configured right out of the box to do one job and do it well: writing.

Like most of you, I'm a long-time Model 100 user and abuser. Hence, my comments on the WP-2 will draw parallels to the Model 100, using it as a frame of reference rather than a standard for comparison.

I don't consider the WP-2 to be a real computer. Neither does Tandy. They market it as a word processor, and it

lacks the other Tandy computers' built-in programming languages, like BASIC. There is a microprocessor inside, and you *can* program it, but that's another (hacker) story.

The WP-2 is the best of a typewriter and a computer. As with a typewriter, you can correct mistakes using the electronic equivalent of correction tape. Unlike a typewriter, the WP-2 lets you correct really big boo-boos. For example, you can move a whole paragraph with your electronic "scissors and paste." Plus, you get a spelling checker and thesaurus built in.

The best thing about the WP-2 is that it's configured right out the box to make you look good on paper. Heck, if it can make my tortured prose look good, it can make *anyone* look good!

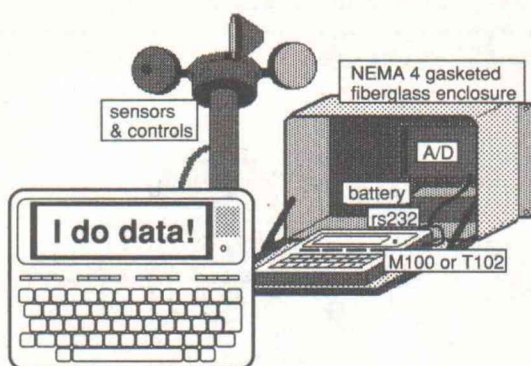
Another important plus: There's no printing mechanism built in. You don't have to lug around a bulky, heavy mechanism just for the purpose of writing. If you must produce finished documents on the road, then perhaps you need an electronic typewriter. On the other hand, most places I go, I can beg someone to let me use their printer.

## SHARE AND SHARE ALIKE

If your WP-2 will be sharing a printer with your desktop machine, constantly swapping the printer cable can become a real hassle. You may want to consider using an A-B switch box to let you print from either machine at the flick of a switch.

An A-B box (Figure 1) has three 25-pin ports on the back labeled A, B, and C. Your printer's cable connects to the C port, and a regular 25-pin serial cable goes from your PC's printer port to the A port. By connecting another 25-pin serial cable to port B and routing it to the front





The **OWL** is our M100/T102-based **On-site Weather Logger**. In addition to the computer, the OWL consists of our analog-to-digital hardware to convert sensor readings into digital form, **HOOT** software to direct the process and display the results, and other elements like our powersaver hardware and a form-fit industrial case. You already know about the screen, the keyboard, the programmability and the economy of the M100/T102 computer. In combination, the OWL is a total solution for environmental monitoring & control. It has found application in everything from planning pest & frost control strategies in orchards large and small, to tracking endangered species of bats at their nest sites, to control of incubators and HVAC.

- Analog to Digital converter plugs into Tandy serial port.
- 7 input channels with 8 bit resolution, 1.28 volts full scale. Perfect with LM34/35 integrated temperature sensors. 0.005 volts per bit. Inputs are protected to  $\pm 150$  volts. Expandable to 49 inputs using optional multiplexers.
- 5 on-off outputs, for control of motors, valves, heaters, etc., Expandable to 32 on-off outputs using optional multiplexer.
- Weatherproof case holds both the T100/102 and the analog to digital converter, etc. . Box has 2 padlock hasps. The A/D is also available without the case.
- Months of operation on battery & solar panel is possible in powersaver mode. The system wakes up intervals to take readings, then goes back to sleep. Continuous operation on AC power adapter & backup battery also supported.
- Probes and adapters available for:
  - temperature, humidity, windspeed & direction, light level, rainfall, surface moisture, pH, pressure, voltage current and more.
- Flexible HOOT software allows you to assign any channel to any type of sensor. Software "drivers" for popular sensors are included. You can modify those or write your own and merge them with the HOOT program for special applications.
- Data can be logged to a RAM file or to a printer at intervals selectable from 10 seconds to 2 hours. Data file format transfers to most PC spreadsheets.

The basic OWL with A/D and weatherproof case costs \$345 — please request our catalog for information about sensors and options.

(Circle 85 on reader service card)



**eme systems**

voice: (415) 848-5725

fax: (415) 848-5748

2229 5th St., Berkeley, CA 94710

#### Circle 82 on reader service card.

of the box, you can easily plug it into the WP-2's printer port whenever you wish.

With the selector switch in the A position, the path from your PC to the printer is active. Select the B position when you want to print from the WP-2.

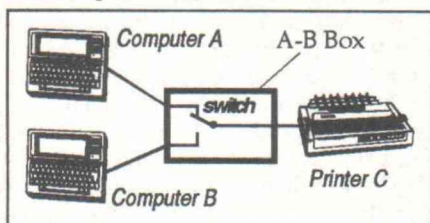


Figure 1. The A-B box lets two computers share a printer.

Serial switch boxes usually have female (socket) connectors, so both serial cables need male (plug) connectors on both ends. I make my own cable from bulk ribbon cable and compatible plastic connectors. You can obtain pre-made cables at any good computer store or electronics supply house. (Make sure they have full 25-pin connections. Some "modem" cables have only nine wires connected internally.)

My own setup actually involves the use of an X-switch (Figure 2), which lets me connect two printers and two computers and select either printer from either computer. Connecting the X-box is straightforward, and the wiring is only a bit more complicated than the A-B setup.

An X-switch provides four possible

paths: A-AA/B-BB and A-BB/B-AA, where A and B are the two input ports, and AA and BB are the two output ports. My primary computer and printer, a 386SX desktop and HP Laserjet, are connected to A and AA, respectively. The WP-2 cable and my secondary printer, a Xerox daisywheel, are connected to B and BB.

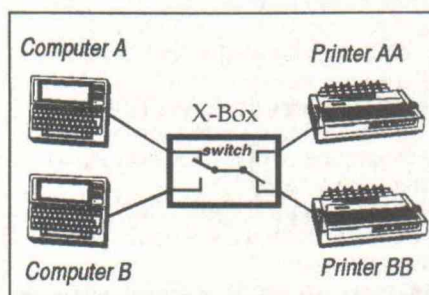


Figure 2. The X-switch lets two computers share two printers.

Since the X-switch has two positions, two of the four paths are active at any one time. In the "standard" position, paths A-AA and B-BB are active. For me that means that the PC/laser and WP-2/daisywheel are active. The other switch position connects A-BB and B-AA, "crossing" the connections to make PC/daisywheel and WP-2/laser the active combination.

#### TUNNEL VISION

I typically use the WP-2 to write lots of

short letters and then print them when I get near a printer. I also use it to write complete, finished documents, and sometimes just first drafts that I export to a PC for finishing.

The WP-2 may display twice the number of characters of the Model 100, but eight lines is still only eight lines. To

## Research confirms that the limited screen area can affect your writing style.

get the "big picture" as I work, I frequently print drafts of my work. While it's not good for the health of trees, I've found that editing/printing, editing/printing yields remarkably good writing results. And research confirms that the limited screen area can affect your writing style.

R. John Brockman (see references fol-

Continued on page 32.



# USE YOUR DESKTOP COMPUTER AS A DISK DRIVE FOR YOUR M-100.

New-  
IBM, MS-DOS  
version works  
over the phone!

NOW  
AVAILABLE  
ON  
M-200!

# Disk+

on Snap-In™ ROM

**GET IT FREE!**  
Of all orders received between  
April 1, 1991 and June 1, 1991,  
one lucky person will have his or  
her full purchase price for this  
item refunded! **ORDER TODAY!**

**Try Disk+ for 30 days. If you aren't as  
excited as we are, return it for a full refund.**

When we designed *Disk+* we did it out of necessity. We wanted a way that we could just connect a Model 100 to our desktop computer with a cable and save files onto the desktop's disk drive. We wanted it to be so simple to use it would be self-explanatory.

Picture this. *Disk+* comes to you on a Snap-in ROM and a diskette for your desktop. You take a quarter and open the little compartment on the back of your Model 100. Then you just press the ROM into the socket. *Disk+* appears on your main menu just like a built-in.

You connect your Model 100 to your other computer using an RS232 cable (available from PCSG for \$40).

You just place the *Disk+* diskette into the desktop's drive and turn on the computer. It powers up automatically and says "awaiting command" on your desktop's screen. Then you just put the widebar cursor on the Model 100 main menu on *Disk+* and press ENTER. You are shown your RAM files arranged just like the main menu.

To save a file to your other system's disk drive, you just move the widebar cursor to the file you want to save and press ENTER. It is saved instantly with no further action.

To look at the disk directory, you just press a function key on your Model 100. You see immediately the disk directory on your Model 100 screen, and it is arranged just like your Model 100's main menu.

To load a file from the diskette to your Model 100, you just move the widebar cursor to the file and press ENTER. The file is transferred to your Model 100's RAM instantly. You can press F8 and go back to the main menu, and the file you loaded from diskette is there, ready to use.

It is so nice to be able to keep your documents, programs (both BASIC and machine code) and *Lucid* spreadsheet files on the diskette, and bring them back when you need them. All files are ready to run or use with no changes or protocol by you.

**If you have access to a desktop computer and don't have *Disk+*, then evidently we have done a poor job telling you about it.**

All files and programs that you load or save, go over and come back exactly as they are supposed to be because of full error checking. This guaranteed integrity is really a comfort. *Disk+* is wonderful in so many other ways. For example, you can do a "save all" of all your RAM files with just a touch of a function key. That group of files is saved on the diskette under a single filename with a .SD (for subdirectory) extension. Any time you want, you can bring back all those files at once, or just one or two if you like, again with one-button ease.

*Disk+* takes up no RAM. That's zero bytes either for storing the program or for operating overhead.

What really excites most *Disk+* users is text file cross compatibility. Your Model 100's text files are usable on your desktop computer, and your desktop's text files become Model 100 text files.

This means you can write something on your Model 100, and with *Disk+* transfer it

instantly to your desktop and start using it right away on your bigger computer. Or the way we like to work is to type in a document on the desktop computer and then transfer it to our Model 100 with *Disk+*. Then we print out the document, beautifully formatted, using WRITE ROM.

*Disk+* works with just about every micro sold, from IBM PC and its clones, to all Radio Shack computers (yes, all), to Apple II, Kaypro, Epson and most CPM. Just ask us. More than likely, your computer is supported.

Incidentally, hundreds of Model 100 owners have gone to their Radio Shack stores and bought a color computer because it is so low priced, and with *Disk+* they have an inexpensive disk drive.

And if that weren't enough, how about this: *Disk+* also provides cross-compatibility between different computers like IBM, Apple or the Model 4 using the Model 100 as the intermediary device. Quite a feature!

The snap-in ROM is really great because you can use other ROMs like *Lucid* or WRITE ROM. They snap in and out as easily as an Atari game cartridge and you never lose your files in RAM.

Anyone who ever uses *Disk+* simply can't do without it. But so many times we have had new users call us and say, "Wow! I had no idea when I ordered it that *Disk+* would be so fantastic. I just couldn't believe that I could use my desktop computer's disk drive with my Model 100 just like it is another main menu."

That's why we sell *Disk+* on a thirty-day trial. If you aren't completely satisfied, return it within thirty days for a full refund. Priced at \$149.95 on Snap-in ROM. MasterCard, Visa or COD.

Distributed by:

## Tri-Mike Network East

P.O. Box 372, Peterborough, NH 03458



COMPATIBILITY: All MS-DOS computers.

# CRDFIL-PC:

*This popular Model 100/102 card file program has grown up—  
and can now even team up with your PC!*

*by George Sherman*

I'm taking a slight detour this month from my continuing series of articles on *DeskMate* because of what I consider to be a momentous announcement.

My first article for *Portable 100* over a year ago was a review of my absolute favorite program for the Model 100/102: *CRDFIL.ROM*, a card file type of database system on a ROM chip. ("CRDFIL.ROM: The Review," Oct. '89)

Since then, I've begun to use my PC more and more and used the M100 mostly for *CRDFIL*. Since the files I use daily for my work are in *CRDFIL* format, my M100 was not relegated to the closet, but was in daily use. However, since my desk space was limited, it was not an easy chore to constantly switch machines. Shortly after my *P100* review, Tony Anderson, *CRDFIL*'s author, asked if I'd be interested in a PC version of the program. My response was an enthusiastic, "Yes!"

I'm happy to say that *CRDFIL-PC* is now a reality. With some very minor changes the program is essentially a very familiar copy of the M100 version. The transition from one to the other is simplicity personified. The only retraining I had to undergo involved making my choices on the various screens presented. The M100 version let me choose options by number or by a designated letter. The PC version uses only the numeric choice. In writing the PC version, Tony tried to

stick as closely as possible to the M100 version, even to the point of using a visual presentation on the PC's

screen of exactly what you see on the M100's screen. Information entered also word-wraps at the border of the presentation exactly as it does on the M100.

The most noticeable difference with the PC version is (of course!) its speed in comparison to the M100. Sorting my famous "humongous file" of 269 cards, each containing six prompts, and weighing in at over 14K bytes, takes minutes,

## Files written on either machine may be transferred back and forth

not hours. One of my files, containing 36 cards with five prompts, took four seconds. A second sort of the same file after a card had been added took barely one second.

I recently asked Tony what he had in

mind for *CRDFIL-PC* now and in the future. He said his purpose in writing the pro-

gram was to give former Model 100/102 users a familiar program in the PC environment to ease their transition as they move up to the PC's. Files written on either machine may be transferred back and forth and used on each with their respective programs.

Consider this scenario: A rather large database in *CRDFIL* format exists in the PC. But a company representative in the field needs a smaller (extracted) subset of the information. Using *CRDFIL-PC*, he extracts a smaller file from the larger file and transfers it to the M100, which he can easily carry. While in the field, the rep makes some changes on some of the cards in the file and adds and subtracts several cards. Returning to his office, he uploads the info to the PC, adds the two files together, and edits the end result to produce an up-to-date office record.

More and more businesses are becoming PC-oriented, and this will allow continued use of the M100/102 as a movable database tool—away from the PC—which stores the main database in *CRDFIL* format.

What's in the future for *CRDFIL*? Tony's next project is to make *CRDFIL* available in a strictly PC-based form, which wouldn't be directly compatible with the M100 platform (because of differences in screen handling), yet make the data "portable" so files can be extracted and used in the M100/102's in the original form. Tony envisions four general formats arising from this approach: First, a 3x5-inch file card form, which equates to 17 lines of printing, each line up to 60 characters long, that will display fine on the PC screen. Second, a 4x6-inch

CARD DISPLAY MODE

MODEL 100 SCREEN EMULATION	
Line 1	Name: T.A.F.T (Tony Anderson)
2	Addr1: P.O. Box 60925
3	Addr2:
4	C/S/L: Reno NV 89506
5	Phone:
6	Contact:
7	Comments: CRDFIL Software/M100 Support
8	

Card Number: 13

Press Enter to Continue:

A typical CRDFIL display on your MS-DOS screen.

Here are your Opening Options:

- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| 1. Create a New File Template       | 6. Sort Cards in an existing file |
| 2. Add Cards to an existing File    | 7. Printer/Output Functions       |
| 3. Display/Search Cards from a file | 8. Other Utilities                |
| 4. Get totals from specified fields | 9. Perpetual Calendar             |
| 5. Edit data on existing cards      | 0. Exit the program               |

Choose one. Select by number:

The opening menu display of CDRFIL.



# ULTRASOFT HAS 'EM!!! WE'VE GOT 'EM ALL!!!

The Hard-to-Find Accessories,  
Software and Peripheral Solutions You Need  
For Your Laptop, Notebook, and Palmtop!!!

*We Support the Following Models  
by Telephone, Fax, or Mail Order:*

Tandy 100/102/200  
Tandy WP-2  
Tandy 1100 FD  
Tandy 1400 LT/FD/HD  
Tandy 1500 HD  
Tandy 2800 HD  
  
Panasonic CF-150/170/270  
Atari Portfolio  
Poqet PC-Computer  
T.I. Travelmate 2000/3000

## **We Also Carry:**

The Kodak Diconix 150+ Portable Printer  
and the Canon BJ-10e Portable Printer

## **We've got those hard-to-find:**

Carrying cases for Laptop & Printer,  
and overseas 220V & 240V AC Adapters  
**In Stock** for all you globetrotters, too!!!

## **WE HAVE THE SOLUTIONS FOR ALL YOUR LAPTOP, NOTEBOOK AND PALMTOP NEEDS!!!**

Call, Fax, or Write Today  
for a FREE Catalog

Please specify the Make and Model of your Laptop, Notebook, or Palmtop.



1 Transborder Drive, PO Box 247  
Champlain, NY 12919  
Tel: (514) 487-9293  
Fax: (514) 487-9295  
9-5 EST Mon-Fri

VISA, MC, and AMEX Orders Accepted!!!  
Also, Government & Educational P.O.'s!!!  
Quantity Discounts Available!!!  
Canadian and Dealer Orders Welcome!!!

Circle 134 on reader service card.

## DESKMATE

file card form, equating to 23 lines of up to 72 characters. Third, a freeform "card" that would be a full screen, 24 lines by 80 characters. Fourth, a "Rolodex" format, 8 lines by about 48 characters. The 3x5-inch, 4x6-inch, and Rolodex formats would relate to the stock continuous-form cards available on the market (i.e., they'd be "standardized" to work with those sizes of card stock). These will be quite similar to the formats provided in the *PRINT* section of the existing version, in which the mentioned styles are already set up, including screen displays.

Tony is also considering the possibility of an additional size called "tickler," or 2.5x3 inches, which is essentially a 3x5 card cut in half, roughly the size of a business card. This can be used by executives, salesmen, etc., as a card-based "to-do" file they can carry in their wallets or pocket secretaries. Its main value would be in the reminder, schedule, or projects types of applications, since there is so little that can one can put on such a card.

*CRDFIL* wasn't intended to compete with what are known as "relational" database systems, which in most instances are far more complex and more capable than is *CRDFIL*. It was designed to be a simple card file replacement system—an electronic card file system, if you will.

When I moved up to the PC, I searched for a filing system that would do for me what I had come to expect of *CRDFIL*. I tried several programs out. None did for me what I wanted. Each did some of the things *CRDFIL* did, and in many instances better. But none did all that *CRDFIL* did. Several I looked at were so complicated that I dismissed them out of hand. I finally settled on one and tried to transfer my information over from the "humongous *crdfil*" to the new format. After days of typing, I thought, "Finally, I can now use a PC based system which will replace *CRDFIL*." I was wrong. In that particular program each item *had* to have a part number for the program to work. In my stockroom, many of the items carried, such as tools, etc., had no part numbers. *CRDFIL* had let me work my cards with or without a particular field's completion. The new program would not. You know what I did? I dumped the new program and went back to the M100 and *CRDFIL*.

*CRDFIL-PC* is available on 3.5-inch or 5.25-inch disks, and may be used directly from the disk or placed in its own subdirectory on a hard-disk system, which can also contain your own data files. To run it, simply type *CRDFIL* at the DOS prompt. It can also be executed by many popular menu programs. As in the M100 version, an extensive menu system within *CRDFIL-PC* guides you step-by-step through the program.

*CRDFIL-PC* is priced at \$24.95, postpaid, and comes with helpful instructions in a disk-based manual. It assumes you are

already familiar with the M100/102 version. There will be a \$5.00 credit to previous purchasers of the *CRDFIL.ROM*, and it will be offered as an added option to future M100/102 version buyers. Order from T.A.F.T., P.O. Box 60925, Reno, NV 89506.

BY GEORGE!

### PRODUCT SPECIFICATIONS & SUPPLIERS

*CRDFIL-PC*—\$24.95  
*CRDFIL.ROM*  
(Model 100/102)—\$74.95

Other Model 100/102 versions are available for use with Tandy Disk/Video Interface, EME Systems' extRAM, and Purple Computing's Booster Pak.

T.A.F.T.  
P.O. Box 60925  
Reno, NV 89506





## Put Your Programs in Suspended Animation With StayAround!

*StayAround*, the new MS-DOS program from North Shore Systems, lets you run and suspend programs, then return to them at the exact points where you left off—even *after* power-down! You never have to reload programs manually or go back through set-ups. Resume operations right where you stopped earlier. With *StayAround*, applications may be out of sight, but they're never out of reach.

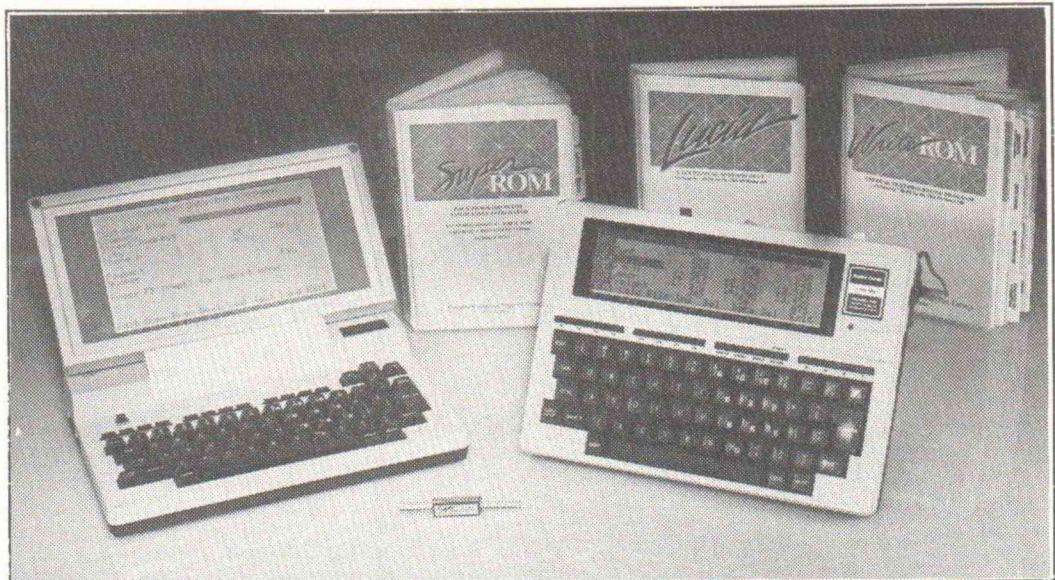
Using only 6.5K of RAM, *StayAround* can support up to 16 applications at the same time. Switching between the applications requires a simple, user-defined two-stroke hot-key combination to call up *StayAround's* main menu, where they select a suspended application.

*StayAround* supports all DOS-based computers, including portables. It requires a 20MB hard disk and DOS 3.x. It retails for only \$59.95. For more information, contact North Shore Systems, Inc., P.O. Box 8366, La Crescenta, CA 91214, (818) 248-1711. Or circle #60 on your Reader Service Card.

## Link Your Mac To Your Model 100/102

The Tandy Model 100/102 computers along with *100duet* from Cabochon can be the most cost-effective additions you can make to your Macintosh. With the Model 102 you can carry a keyboard almost anywhere you go. The Model 102 makes it easy to take notes or work on assignments away from your Macintosh. *100duet* makes it easy to load your work into the Macintosh for use with your favorite word processor. And you can copy files back to the portable for in-field revisions!

The hardware cable has a DB-9 and a Mini-8 connector for connecting to both the older 512K and 512KE Macs as well as the newer models. The software is easy to



Here are just a few of the many fine PCSG products now carried by Tri-Mike Network East.

## TRI-MIKE ACQUIRES PCSG LINE!

Tri-Mike Network East is pleased to announce that it has been granted exclusive worldwide license to market and support the entire Model 100/102/200 line of Portable Computer Support Group products and services.

In addition to the legendary *Super ROM*, the premiere multi-function ROM, TMN East will reintroduce many quality PCSG ROM products (*Write ROM*, *Lucid ROM*, *Disk+*, *Business Analyst*), cassette-based programs (*RESTOR*/*FILMEN*, *Lucid Utilities*, *SORT2+*, *TUTOR+* [excellent typing tutor!],

*TENKY+*, *TYPE+*, *DATA+*), and will continue to provide custom ROM products for corporate, industrial, law enforcement, educational, and other specialized applications.

As always, TMN East will maintain the tradition of high quality products and support established by PCSG.

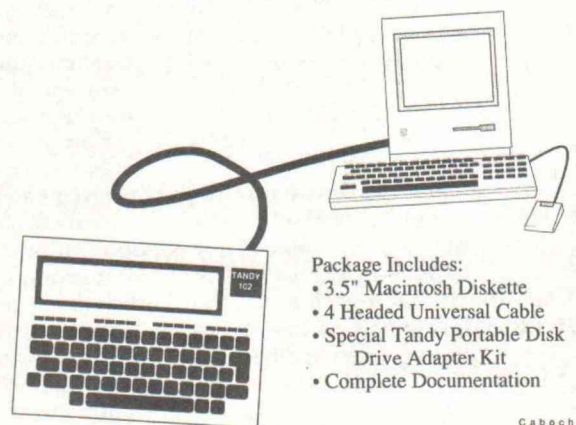
In celebration of this event, TMN

East is offering valuable prizes for early-bird purchasers of PCSG products. See TMN East advertisements in this issue for details!

For more information, contact Tri-Mike Network East, P.O. Box 372, Peterborough, NH 03458. Or call (603)924-TMNE [924-8663]. Or circle #66 on your Reader Service Card.

## 100duet

The Macintosh Connection to the Tandy Model 100 & 102 Personal Computers



Package Includes:

- 3.5" Macintosh Diskette
- 4 Headed Universal Cable
- Special Tandy Portable Disk Drive Adapter Kit
- Complete Documentation

System Requirements: Macintosh with at least 512K of memory. Tandy Model 100 or 102 computer. Optional: Tandy Portable Disk Drive.



Transfer files to and from your Macintosh and Tandy 100, 102, or TPDD with 100duet!



COMPATIBILITY: All MS-DOS computers.

# Moving Up: Chapter Two

## *Specifics on MS-DOS, and some starter shareware*

by Tony B. Anderson

Picking up our train of thought from last month's article ...

The PC, through its base operating system, MS-DOS, is a disk-based system, unlike the Model 100 family, which is a RAM-based system. Rather than having several programs and files in RAM, selecting those you want to use, programs and files are stored on disk and loaded into RAM in order to work or use, one at a time. Except that MS-DOS allows a number of programs to actually be loaded into RAM at the same time, each performing its own tasks as needed, generally without conflicts with other programs that are also loaded. Such programs are called "TSR" (Terminate and Stay Resident) programs. They can be loaded, installed and exited, remaining resident and active as you need them. Additional programs can be loaded on top of them

```
DEVICE=RAMDISK.SYS
DEVICE=ANSI.SYS
FILES=20
BUFFERS=20
```

Figure 1. At bootup time, this typical CONFIG.SYS file installs a RAMdisk, installs the ANSI.SYS driver to configure the screen and keyboard, and reserves space for file buffers.

(higher in memory)—given that additional RAM space is available—and some of these may also be TSR's. They can be thought of as being similar to disk operating systems (DOS'es) for the various disk drives available to the Model 100 family. They are loaded and become resident programs which can be accessed or entered as needed, often invisibly, or with a couple of keystrokes.

The MS-DOS operating system is capable of handling multiple TSR's without conflict, depending on available space and lack of inherent conflicts, of

course. Such programs, generally operating invisibly, become part of the operating system itself, and in fact "configure" the PC into almost any custom setup the user might want or need.

Loading a mouse controller TSR, for example, configures the computer to support the mouse. Loading a printer driver TSR configures the computer to support a specific printer or range of printers.

The first thing we notice when we turn on a PC is that it isn't immediately ready to use like the Model 100 family is, except in a few cases where the PC is designed around ROM-based software. In most cases, the PC has to go through several steps to get ready for use, often called the "booting up" process. This is the process of loading and installing the various TSR's that customize the user's configuration.

First, the PC goes through certain preliminary checks: checking available RAM space; doing self-test diagnostics; loading the calendar and clock values into memory if a hardware clock is installed; and finally, loading the software and programs that configure the computer into a usable machine.

This process takes between 45 seconds and a minute or so, and unless you have a menu program or integrated software package that comes up as the first application, the system takes you to the DOS prompt, which indicates the default disk drive, or other parameters you can customize, and waits for you to enter a command—to tell it what to do next.

At the DOS prompt you can type a command to run a program or to perform specific actions allowed by the command interpreter. To view the directory of the default drive, for example, you would type *DIR* and press the *ENTER* key. MS-DOS responds by scrolling

a list of all the files, programs, or data that are contained in the default directory. By adding */P* or */W* to the *DIR* command, you can "page" the display, stopping after each increment of 23 files, allowing you time to read the list, or list only the file names in five columns across the screen. Pressing *ENTER* again goes on to the next group of file names.

```
ECHO OFF
PROMPT $P$G
PATH=D:\; C:\; C:\UTILITY; C:\MENU;
GRAPHICS STANDARD
BREAK=ON
MENU
```

Figure 2. After CONFIG.SYS has done its job at bootup time, this typical AUTOEXEC.BAT file automatically runs (passing commands to the computer as though you'd typed these lines yourself). It sets the DOS prompt to be displayed, the search path for programs, a couple of other parameters, and then runs a program called MENU.

There are three types of programs that will run directly in a PC, not including BASIC programs, which run under the BASIC interpreter, variously called BASIC, BASICA, or GW-BASIC, depending on the exact version provided for your PC.

The first type of program is identified by the file name extension *.EXE*. This is an executable program that runs in the PC's native language. It can be any form of assembly language or compiled source code, which runs in the PC as assembly language. *.EXE* programs are generally larger than 64K in size.

The second type is identified by the file name extension *.COM*. This is virtually the same as an *.EXE* program, except that it is generally smaller than 64K in size. TSR's are usually *.COM* programs. *COM* is generally interpreted to mean a *COM*mand program.



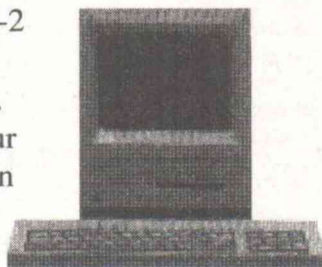
# WPduet

## The Macintosh connection to the Tandy WP-2 Portable Word Processor

**WPduet** turns the Tandy WP-2 into the affordable portable keyboard for your Macintosh. With the battery powered, four pound WP-2, you can work on your documents anywhere. Then, you can transfer your documents to your Macintosh with **WPduet** for final editing and printing.



Cabochon, Inc.  
1740 Massachusetts Avenue  
Boxborough, MA 01719  
508/264-4648  
508/263-9627 FAX



**WPduet** provides error free transfers of your documents and converts them to MacWrite II or Rich Text Format for use with Microsoft Word, Microsoft Write or WriteNow 2.2.

**WPduet** comes complete with everything you need to use the WP-2 as a portable keyboard for the Macintosh: software, manual and cables. Find out how easy portable computing can really be.



Macintosh is a trademark of Apple Computer. MacWrite II is a trademark of Claris. WP-2 and Tandy are trademarks of Tandy. Cabochon, WPduet are trademarks of Cabochon. Microsoft, Microsoft Word, Microsoft Write are trademarks of Microsoft. WriteNow is a trademark of T/Maker.

Send check or money order for  
\$99.95 + \$3.00 s/h to  
Cabochon, Inc. for each unit.  
MA residents add 5% sales tax.

Circle 9 on reader service card.

The third type isn't actually a program, but a group of plain language statements that can cause certain actions to be taken, or certain programs to be run in a specified order. It is identified by the file name extension .BAT, which stands for BATCH file. It is a plain ASCII text file that contains statements or commands that are acted upon by the computer, as if they had been typed at the keyboard one at a time.

The above types of programs are run by simply typing their name and pressing the ENTER key when you are at the DOS prompt. It's not necessary to include the filename extension unless you have more than one program form in a directory; programs with the same name but different extensions, like MENU.EXE, MENU.COM, and MENU.BAT. The program doesn't actually have to be in the default disk directory, as long as it is in the search path, discussed a little later in this article. The "default directory" is the one that is indicated by the DOS prompt, and except for the search path, contains the programs and files you can use "by default"—by simply typing their names. If the program is not in the default directory or the path, you have to include a path specification, to tell the computer where to find the program. (More on that next month.)

Batch files are very useful in automat-

ing many activities in the computer. In fact, the booting up process, when you turn the computer on, is actually a batch process, controlled first by the BIOS ROM, then by two special files in the directory of your system disk.

The BIOS ROM, after performing the various self-tests, loads the operating system programs, called the system files. The first two are the IBMBIO.COM and IBMDOS.COM. This is followed by COMMAND.COM, which is the MS-DOS command interpreter.

## The third type isn't actually a program.

### CONFIGURING THE SYSTEM

After the three system files are loaded, control passes to a file called CONFIG.SYS, which loads the specified configuration TSR programs. These are the most basic elements that determine how your machine will work. They form part of the computer's operating system.

Eventually, you will use your text editor or word processing program to

customize the CONFIG.SYS file to suit your own needs. Most likely, your computer came from the factory with a very basic configuration setup. Later on, you will be able to add a lot of additional features by changing the CONFIG.SYS file.

The most basic recommended configuration is listed in Figure 1 which accompanies this article. If you don't yet have a text editor or word processor working, you can probably get started with the standard version that came as part of the initialization package with your computer.

RAMDISK.SYS is a program that creates a 128K RAMdisk in the Tandy 1400. Other models may have programs that do the same thing, but are called by a different name; check your manual.

ANSI.SYS configures your software so that some programs which use control characters for moving the cursor or locating text on the screen will operate properly. It is also useful with some graphics display programs. This configuration is optional, but speeds up screen display in programs that use direct screen access. If you don't already have it installed, such programs will usually stop and ask you to load it manually. It doesn't affect anything else if you have it loaded and your programs don't need it, so you might as well load it



automatically.

**FILES** and **BUFFERS** preset and reserve space for file and device access. 20 is a more-or-less standard amount; some applications may require more. The vast majority of applications will run with 20 as the initial configuration.

## AUTOEXEC.BAT

Once the configuration TSR's are loaded, MS-DOS looks for a batch file called **AUTOEXEC.BAT**, which loads additional TSR programs and drivers, or defines various aspects of the system. Figure 2 is a typical example.

**ECHO OFF** prevents screen display of each command from the **AUTOEXEC** file as it is typed to the screen.

**PROMPT \$P\$G** tells the computer what prompt to display as the "DOS prompt," the one you see when you're at the command line and can type commands. The dollar sign, followed by a letter, sets up a particular prompt display. You can look up what options are available in your DOS manual, and choose those that suit your own taste. **\$P\$G** causes the DOS prompt to tell you what disk directory or subdirectory you are in at any given time—valuable information for new users.

**PATH =** sets the system "path," the path that MS-DOS will follow in looking for programs you tell it to run. In the particular path setting shown, MS-DOS will first look for a program in drive D, the Tandy 1400's 128K RAMdisk. (Obviously, if you aren't using a RAMdisk that is defined as drive D, you wouldn't need the D: parameter.) If the requested program is not found, the system will next look in the root directory of drive C (C:\), and if not found there, it will then look in a subdirectory on drive C called **UTILITY**. Finally, it will look in the subdirectory called **MENU**. If the file is not found anywhere along the path, MS-DOS will report a *File not found* error. The path can be extended or changed to suit each user's individual situation or needs.

**GRAPHICS STANDARD** invokes a screen dump program that will allow you to dump the screen, including graphics, to a "standard" printer. There are various options, depending on your particular type of printer. Check your MS-DOS manual for details or different options.

**BREAK=ON** enables the **CONTROL-BREAK** key, which can be used to stop a running program, similar to **CTRL-C** or **SHIFT-BREAK** on the Model 100. If you do not include this command, many programs cannot be stopped until they end naturally. In some programs, it is necessary to press **CTRL-BREAK**, fol-

## Recommended additional reading...

Most Tandy computers come with manuals which are basic guides to use of the machine. Unfortunately, they are often sketchy when it comes to covering the subject matter in any depth. The following books are recommended reading for new users of MS-DOS systems.

1. *DOS Made Easy*, by Herbert Schildt. Published by Osborne/McGraw-Hill; \$19.95. A good, general purpose book that explains most of the MS-DOS features, along with options, command syntax, and usage, in non-technical terms.
2. *Tandy 1000 MS-DOS Reference Manual*, Radio Shack Catalog number 25-1508. A two-volume set, the second volume covers GW-BASIC (you'll want the BASIC manual when we get into BASIC programming later in this series). Listed in the general catalog at

\$29.95, it is often available at \$19.95, and occasionally as low as \$9.95 on a sale.

3. *MS-DOS, The Basics*, by David A. Lien. Radio Shack Catalog number 25-1506. The third edition of this manual is listed in the general catalog at \$7.95, and is a good introductory manual to MS-DOS written in Dr. Lien's popular, easy to read and understand style. While it seems specific to the Tandy 1000 and 3000 series of computers, it contains a great deal of generic information that is also applicable to the Tandy laptops, and is written at a basic, introductory level. This volume is identified as Volume 1. For more advanced users, there is a Volume 2, *MS-DOS: Advanced Applications*, Radio Shack Catalog number 25-1507, priced at \$14.95.

lowed by **CTRL-C** in order to stop the program.

**MENU** assumes that you use some sort of menuing program. This command will cause the menu program to run if it is named **MENU.EXE**, **MENU.COM**, or **MENU.BAT**. We'll discuss menuing programs in a later article—they're an important concept in making the PC as easy to use as a Model 100. If you don't use a menu program, or want some other program to be run, just place its name as the last entry in the **AUTOEXEC.BAT** file. Control of the computer is effectively handed over to the last program named in the file. It's the equivalent of a "chain" or "run" command. It just runs the program, the same as if you had typed the program name at the DOS prompt. Normally, if you list several program names in a batch file, as each program ends, it will return to the batch file and run the next program, or perform the next action defined in the file. That is one of the features that makes batch files so useful, you can run several related tasks by running the batch file, which handles everything for you.

## THIS MONTH'S SHAREWARE DISK

The shareware offering this month, two programs, are based on the most basic need of new PC users: help in understanding MS-DOS and its cryptic, often unintelligible command structure.

**HELPME.EXE** is a program you install in your system's path, so you can get to it from the DOS prompt. Simply type

**HELPME** (and press the **ENTER** key, of course), and the program will present a menu list of the most common MS-DOS commands. You select the command you want additional information on by moving the cursor over the name of the command and pressing the **ENTER** key. The program will pop up a window that describes the command syntax, the basic function, and lists various options.

**DOSHELP.EXE** is a more complete list of the MS-DOS commands, including many of the more obscure ones, which gives you an almost complete manual description of the function. You have virtually the entire MS-DOS manual available at any time you need help.

Both programs can be stored in your system path, or left on the distribution disk for use when needed. Specify PC Shareware Disk #1 when ordering, and indicate 3.5-inch or 5.25-inch disk. \$6.00 includes shipping charges.

## COMING ATTRACTIONS

Next month: Dealing with the disk system, file compression and archiving utilities.

Tony Anderson, a sysop on CompuServe's Model 100 Forum for six years, is a frequent contributor of articles and programs to the Forum, and also develops and sells commercial software for the Model 100 family, including the popular CRDFIL database. He'll be happy to answer questions sent to him via CompuServe's MAIL facility (send to 76703, 4062), or by postal mail at P.O. Box 60925, Reno, NV 89506 (please include SASE if requesting a reply).





**Changes your Model 100 into a totally different computer with capability you never thought possible.**

**Lucid<sup>TM</sup>**  
**on Snap-In<sup>TM</sup> ROM**

*Another fine product from the innovative people at PCSG!*

Infoworld  
rated Lucid's  
performance  
"excellent"

NOW  
AVAILABLE  
ON  
M-200

**TMNE says "Satisfaction Guaranteed  
or your money back within 30 days!"**

LUCID<sup>®</sup> is here now. It is on a ROM cartridge that snaps into the compartment on the back of your Model 100. It takes no memory to load and no memory for operating overhead. That means you have the full 29.6k bytes free to store your data.

First, LUCID<sup>®</sup> is memory conserving. It will let you build a large spreadsheet—255 row by 126 column capacity. You build huge spreadsheets in your Model 100's RAM that could consume 80 to 100K on a desktop computer.

Secondly, LUCID<sup>®</sup> is fast. LUCID<sup>®</sup> is so rapid, a 36 column corporate financial statement took less than 4 seconds to calculate.

Thirdly, LUCID<sup>®</sup> has features you won't find in most other spreadsheets. For example, when you type a label (text) it will cross column boundaries; in other words when you type a label or title it will appear as you type it irrespective of column or width. LUCID<sup>®</sup> also allows you to set column widths individually, and of course LUCID<sup>®</sup> has insert row and insert columns, as well as other standard features. LUCID<sup>®</sup> even lets your formulas refer to cells in other spreadsheet files.

Further, LUCID<sup>®</sup> has what no other spreadsheet has: Cut, Copy, and Paste. It uses the same keys as Cut and Paste in TEXT, but here's the difference: it takes all the formulas with it when you paste and they all automatically recalculate with the entire sheet.

And here is what is really amazing. You can copy or cut from one spreadsheet and paste into another spreadsheet or even a TEXT file.

LUCID<sup>®</sup> supports all BASIC math functions as well as Log, sine, cosine, tangent, exponentiation and other sophisticated math functions.

LUCID<sup>®</sup> has so many features that you will say "this is what I need in a spreadsheet", such as automatic prompting of an incorrectly typed-in formula showing just where the mistake was made.

LUCID<sup>®</sup> has expanded "go to" functions that remember and produce a windowing capability.

But perhaps most remarkable is that LUCID<sup>®</sup> is not only a spreadsheet but a program generator as well. First, LUCID<sup>®</sup> lets you protect all cells against entry or change, and then unprotect just the cells you want for someone else to use as input fields.

LUCID<sup>®</sup> will not only process values, but text input as well so that the facts other than numbers can be responded to. LUCID<sup>®</sup> has the ability for you to refer in a formula to cells containing words. This feature combines with the capacity of doing "if then" statements that work by doing table look-ups against even massive X/Y charts of text or numerical information. You can produce a program that responds to inputs with no programming knowledge whatsoever.

You can prepare a report section in your spreadsheet with instructions to your user for printout, and they can produce a personalized printout that responds to their input. All your formulas and tables that did the calculations and provided the facts are invisible to that user. LUCID<sup>®</sup> is useful for doctors for patient questionnaires, troubleshooting technicians, purchase clerks, people doing job quotes, stores for customer workups, insurance agents and anybody who needs to process specific facts and numbers to produce a report based on those responses.

LUCID<sup>®</sup> comes with a manual that explains not only the characteristics of LUCID<sup>®</sup>, but will train you how to use a spreadsheet even if you have never seen one before. You are shown how to do budgets, forecasts, breakeven analysis amortizations and many other types of personal and business reports and calculations.

User friendly is such an over-used term in this industry, but a typical comment has been "I have never seen a spreadsheet that does so much, and yet LUCID<sup>®</sup> is so much

easier and faster to use."

LUCID<sup>®</sup> is a result of a most exhaustive developmental effort in which PCSG's objective was to develop a spreadsheet that was better than the state-of-the-art. We are so pleased because LUCID<sup>®</sup> provides for the Model 100 spreadsheet capability you cannot equal on a desktop computer.

LUCID<sup>®</sup> is, in our opinion and that of those who have examined it, a breakthrough. We sell it on a 30 day trial. If you are not completely satisfied, return it within 30 days for a full refund. Priced at \$99. on snap-in ROM. MasterCard, Visa or COD.

© PCSG 1984

### **GET IT FREE!**

Of all orders received between  
April 1, 1991 and June 1, 1991,  
one lucky person will have his or  
her full purchase price for this  
item refunded! ORDER TODAY!

*Distributed by:*

**Tri-Mike  
Network  
East**

**1-603-924-8663**

**P.O. Box 372,  
Peterborough, NH 03458**

**Circle 74 on reader service card.**



## Dvorak Keyboard System

Give your laptop the Rolls-Royce of keyboard systems. The Dvorak key arrangement eliminates wasted motion, reducing finger travel by more than 90%! Type faster and more accurately. There's less error, less fatigue. And learning to type is much easier on a Dvorak keyboard. No Hardware! Uses less than 500 bytes of RAM. Works in BASIC, TEXT, TELCOM, etc., just like it came from the factory that way! (Tandy 100, 102, 200 and NEC-8201) \$36.95—Portable Disk Drive Disk. \$39.95—Standard Tape Cassette.

## One-handed Keyboard!

Special Dvorak one-handed keyboard uses the same efficient design principles as the above system, and makes typing faster and easier for people who have the use of only one hand. Less fatigue and more work! Just like the above software, it is small, simple to use, and works in TEXT, TELCOM, BASIC, etc., and commercial software without any hassles. Your computer acts like it came from the factory with a one-handed layout. And you can switch between the one-handed layout and the original (two-handed QWERTY) layout by pressing a key. \$36.95—Tandy PDD disk, \$39.95—Standard tape cassette. Please specify left or right-handed version when ordering.

## TMN Assembler

from Tri-Mike Network East

This assembler requires less than 3K RAM and is relocatable. It assembles source code from any file or device; accepts data in hex, decimal, or ASCII; creates a ready-to-run .CO file directly on the Menu or an optional trial assembly. Six built-in macros make programming even easier. Output all or any portion of the assembled listing to screen or printer, with optional user-inserted pauses. Manual includes extensive RAM and ROM maps! (Model 100/102, 200, NEC 8201/8300) \$36.95—Portable Disk Drive Disk. Standard Tape Cassette—\$39.95

## TMN Debugger

from Tri-Mike Network East

Who ever heard of an assembler without a debugger? TMN offers one to use with the above assembler. Model 100 and 102 only). \$36.95—Portable Disk Drive. \$39.95—Standard Tape Cassette.

**Granite Street Portables**  
P.O. Box 651  
Peterborough, NH 03458

No C.O.D.'s

or credit card orders, please.

Allow six to eight weeks for delivery.

US Postage and handling included.

See our ad for books in this issue, too!

Circle 35 on reader service card.

ments to Define Bytes or Define Words (word = 2 bytes). This is a common way for one part of a program to pass a value to a subroutine, for example:

```
main: sta value1
      shld value2
      call sub1
      .
      .
sub1: lda value1
      lhld value2
      .
      .
      ret
```

```
value1: db 0
value2: dw 00
```

In the above listing, the main program stores A and HL in the data storage areas, value1 and value2. Then a subroutine that needs those values will get them from the storage area, and use them as needed.

Now consider this alternative:

```
main: sta sub1+1
      shld v2+1
      call sub1
      .
      .
sub1: mvi a,0
```

```
v2: lxi h,0
    .
    .
    ret
```

Note that the main program stores the A and HL values directly into the operand address of the instruction designed to retrieve those values. This eliminates the need to allocate space for the variables, and an "immediate" instruction (MVI and LXI) executes much faster than its "reference" counterpart (LDA and LHLD). You save bytes and have a faster running program!

I've been using these programming techniques for some time now, and I'm sure they will be useful to the experienced (as well as the novice) assembly language programmer.

Paul can be reached by modem on CompuServe (72227,1661) and GENIE (P.GLOMAN), or by mail at 9406 N.W. 48th St., Sunrise, FL 33351 (please enclose SASE if you're requesting a reply).



Continued on page 23.

lowing article) writes that editing on a regular PC screen cannot give you the sense of "flow" of your document. You are artificially constrained to a 24-line viewport of your documents. While you can scroll up and down, you can only see 24 lines at a time. You need to be able to step back and see the "big picture." With the WP-2's 8-line screen this problem is even more acute.

He quotes research which suggests that the "linearity of scrolling focuses attention to the local [sentence level] problems rather than with more global [organizational, audience] level problems."

Says Brockman, "We need to correct and revise from a much larger perspective. Long-term memory alone cannot make up for the portions of the copy that aren't visually present." My edit/print cycle on the WP-2 seems to confirm his findings.

Another important technique I use is just to write. When I get a thought (a rare occurrence), I just add a new paragraph wherever I happen to be. Because of the WP-2's limited viewport onto my document, it's hard to remember exactly where the thought goes. But during the next print cycle it's easy to see where it should go.

## THE IN-BOX

This is *your* column. I want you to help define the "yellow brick road" for me to follow. Fire up your WP-2 and send me a letter in care of *Portable 100* or directly at P.O. Box 28181, Santa Ana, CA 92799-8181. If you prefer the electronic medium, use GENIE address STAN.WONG, CompuServe address 70346,1267, or Internet address dasun!wongs@Sunkist.West.Sun.Com.

Oh, one last item: Yes, I did write this entire column on my WP-2. Not a single byte was sullied by the likes of a PC or Mac.

Not bad for a "wordprocessor," huh? So until next time, don't forget to write! (Pun intended.)

References for further reading:

1. Brockman, R. John. *Writing Better Computer User Documentation*, Wiley, 1990, p. 239.
2. Nugent, Mike. "The WP-2 Portable Wordprocessor," *Portable 100*, November 1989, p. 8.
3. Wong, Stan. "Whoops and Auntie Em: A Tale of Two Computers," *Portable 100*, May 1990, p. 20.
4. Grotta, Daniel. "Adding Memory to Your Tandy WP-2," *Portable 100*, March 1990, p. 20.
5. Daigle, Michael. "They Laughed When I Sat Down to Word Process," *Portable 100*, December 1990, p. 10.
6. Wilburn, Gene. "TWPKIT for The WP-2," *Portable 100*, March 1991, p. 10.





COMPATIBILITY: Model 100, 102, 200, NEC 8201/8300, Kyocera KC-85, Olivetti M10.

# Joyriding in the Model T: Tandy's "classic" lives!

*Portable 100 welcomes beginners and old-timers alike to  
"Mr. Wilburn's Neighborhood."*

*by Gene Wilburn*

**T**he Tandy Model 100/102 (M100 for short) is, quite simply, the neatest little computer that ever hit the streets. Unlike "appliance computers," such as the Tandy WP-2, the M100 has panache. It's a classic.

Michael Daigle has dubbed the M100 the "Model T," evoking images of that venerable earlier technology that likewise had a profound impact on our lives. Thanks, Michael. I'm going to borrow your delightful coinage to cover the Tandy 100/102, its younger, heftier brother, the Tandy 200, as well as its cousins, the NEC 8201/8300, Kyocera KC-85, and Olivetti M10.

Since its introduction in 1983, people have been smitten with the amazing capabilities of this inexpensive, totally portable, nifty little do-everything machine. You can write with it, maintain schedules with it, play games on it, connect to remote systems with it, and program it. With its native 32K RAM space, text processor, scheduling and address modules, built-in 300 bps modem, plus a really useful implementation of Microsoft interpreted BASIC, the M100 was a self-contained, ready-to-use computer, right out of the box.

And didn't it catch on! During its heyday it seemed every journalist in North America used one. I still remember watching a World Series game where the TV camera panned the press box, revealing dozens of M100's lined up across the tables like jets on a carrier deck.

One of the selling points of the M100 was that you didn't have to be a rocket scientist to use the thing. It was the kind of computer you could buy for your aunt or uncle. Even Jerry Pournelle of *Byte* magazine used a Model T. The operating system interface was so simple that nobody was intimidated by it—you

simply turned on the computer, highlighted what you wanted with the cursor bar, and pressed ENTER. It was the world's first, and maybe only, user-cuddly micro.

The M100 caught the fancy of home users, hobbyists, programmers, executives, and even DP professionals. A flourishing CompuServe forum, the M100SIG, was established to provide a meeting place for enthusiasts and assistance for new users, and magazines like *PICO* and *Portable 100* were founded to support users of the M100 family.

People began writing programs for the M100 by the hundreds, then by the thousands. Many of these programs

occurred the moment I first saw one in a Radio Shack store in 1983. I grabbed my credit card and bought on the spot. It looked like an ideal match for my freelance writing, and it was. I've pumped over 150,000 words through the thing.

In my day job (computer systems), I convinced my employer to purchase a small fleet of M100's. They were used for everything from data collection for a mainframe to word processing. It was common to walk down the hall and see two or three M100's stacked up at the secretaries' desks with yellow Post-It's attached telling which files to transfer into the corporate IBM Displaywriters. The M100's looked like tugboats nuzzling up to a supertanker. (Poetic justice: the Displaywriters are long gone, but the M100's live on.)

Okay, you say, that was the 80's and this is the 90's. Where does the M100 fit in 1991?

To be honest, the M100's are not the hot items they once were, though, thankfully, the T102 is still in the Radio Shack catalog. Many journalists have switched to portable MS-DOS computers and most programmers and hobbyists have Macs or PC's on their desks. No one would argue that the M100's low-contrast, limited-display LCD screen, its small RAM space, or its slow processor is state-of-the-art. The current crop of 286 and 386SX DOS notebooks run rings around the M100's (and so does the price, natch).

Despite all that, the M100 holds its own. The reason: It's an inexpensive, interesting, open-ended computer, and just like the Model T automobile, it's still fun to take out on the road.

It has staying power. My TRS-80 Models I and III are history, as are my

---

**... M100's lined up  
across the tables  
like jets  
on a carrier deck.**

---

began to collect on BBS's and in the CompuServe M100SIG libraries. Third-party hardware and software vendors developed M100 products of enormous ingenuity and practical usefulness.

Some owners used their M100's as adjuncts to their desktop systems. For others, their M100 was their sole computer. It provided them with everything they wanted or needed.

My own involvement with the M100

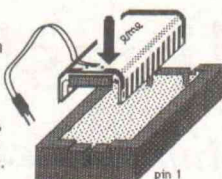




Advanced  
Memory for your  
100/102/200!

**extRAM** is a 32K byte read/write memory expansion that fits into your Tandy's internal option ROM socket.

extRAM fits into the option ROM socket in the 100/102/200. A quick 2-pin plug connects extRAM to battery and WR lines, all under the snap-on cover. Easy to install.



There are two ways to use extRAM:  
(It's one or the other at any one time.)

As a **RAM-file-bank**, you double your space for .DO, .BA and .CO files. You store reports, data and programs you aren't currently working on out of the way in the extRAM and call them back instantly when you need them. Our improved file-bank software hides in the extRAM itself, so it uses minimal RAM and it is "cold boot" proof too. It also now includes extensions to BASIC for reading and transferring individual text files. Adapted from original software, *SLX* and *EXTBAS*, © 1989 by Paul Globman.

As a **ROM-file-bank**, or **emulator**, you can load extRAM with the kind of software that normally resides on option ROM chips. But no more physical chip swapping! You swap in new ROM *images* on command, from files stored on disk or RS232. Great for users of more than one ROM and for ROM developers. Loads 32K image in 40 seconds. Works with most ROM software. Software R2D2X © 1990 by Wilson Van Alst.

The software comes with each extRAM in the form of listings and instructions in a 38+ page manual. Optionally, to save typing, you can order a disk with all the programs in machine-readable form.

We accept Visa/Mastercard, check, money order (\$ U.S.) or qualified Purchase Order.

extRAM for M100	\$75ea	_____
extRAM for M102	\$75ea	_____
extRAM for T200	\$75ea	_____
extRAM software disk	\$15ea	_____
(circle 35" disk format: tpdd ms-dos Mac)		
	subtotal	_____
+ tax (California sales only) 7%		
+ domestic priority mail shipping		
	Total	_____

(Circle 83 on reader service card)



**eme systems**

voice: (415) 848-5725

fax: (415) 848-5748

2229 5th St., Berkeley, CA 94710

## MODEL T JOYRIDE

Apple II and Osborne I. My original IBM PC's have been replaced with 286's and 386's, and along the way I added a Mac SE and a Tandy WP-2. But in all my buying and selling, I never once considered selling my M100. It might be slower than I'd like and, admittedly, not as easy to view as I'd like, but the little sucker still packs a punch!

There's never been a true replacement for it. The WP-2 has its own virtues, but while I like its smaller size, lighter weight, and 80-column display, I can't write a program with the thing and its *TELCOM* program appears to have taken a direct hit from a design Scud. Because the M100's have no logical successors, people just keep on using them.

And that's what this column—MODEL T JOYRIDE—is going to be about: using, and enjoying, the Model T family—100's, 102's, 200's, and clones. For the sake of brevity, I will use the terms *M100* and *Model T* to include, generically, all of these models. I'll use the designators *M100*, *T102*, *T200*, and *NEC PC8201A/8300*, etc., when I need to distinguish between them.

There's an entire generation of Model T owners out there who missed the early years of excitement and who aren't familiar with the pioneering and loving work that has left a legacy of thousands of ingenious M100 programs and dozens of almost indecently clever hardware widgets that can give your Model T wings. (So what's an occasional mixed metaphor among friends?)

Whether you inherited your M100 as a hand-me-down from an older sibling, found one at a garage sale, bought one from a neighbor, or purchased one directly from Tandy, you'll be pleased to know that there are thousands of M100 owners across North America—more than 500,000 of them, with more coming aboard every day. With numbers like that, what we've got here is a potential electronic Woodstock. Imagine for a moment a picnic in upstate New York with over half a million Mod 100 owners sitting on the hillside eating hot dogs, drinking beer, and calculating mortgages. Awesome!

The JOYRIDE column will begin with the basics—an orientation to the M100 as it comes out of the box. We'll look at how to use the built-in programs effectively, how to connect an M100 to a Mac or PC, how to back up files to cassette, disk, or another computer, and how to use the built-in modem.

Next we'll branch out to hardware enhancements—RAM expansion and those amazing ROM's that are still available (and some new ones to come!). We'll

look at some of the new programs being written for the M100, and we'll dig out some of the classics. We'll explore the use of the built-in modem and explain how to connect to a BBS, or to CompuServe, or to GENie.

We'll look at the ways the M100 can be used either by itself, or in conjunction with a desktop computer, as a productivity tool for such things as writing, idea generating, checkbook balancing, invoicing, scheduling, or learning French.

We'll even take a gentle tour of M100 BASIC. Who knows, you may discover there's a latent programmer in you waiting to emerge.

Last, but not least, we'll explore everyone's favorite topic: cables.

Above all, this column is about the fun of using an M100, with tips on how to

**With numbers like  
that, what we've  
got here is a  
potential  
electronic  
Woodstock.**

use it more productively. We welcome all of you M100 veterans, too, but don't expect to find any ROM calls here. This is a beginner's column, second time around, for those who are using the M100 first time around.

If you've got suggestions or questions, please send them along. If you've got interesting stories about how you use your M100, send those along, too. Let's stock up on penlight batteries and give the old Model T a spin!

You can communicate with Gene via CompuServe (his ID is 72435,732), through regular mail via the Portable 100 magazine address, or direct: 91 Inglewood Drive, Mississauga, Ontario, Canada L5G 1X9 (be sure to include sufficient postage if you mail to Canada.) Please enclose an SASE when requesting a reply.





# The Portable 100 Classifieds

## SOFTWARE

**TRANSFER.COM** MS-DOS/Tandy Laptop \$9.95 plus \$1.00 shipping and handling (Min. \$18 for MC or VISA orders; Calif. residents add 7% tax).

Easily transfers .DO files both ways between MS-DOS computers and your Model 100, 102, or 200 laptop. MS-DOS formatted 5.25-inch disk contains the transfer program, complete documentation and several unique files, including laptop programs not found anywhere. Write to: McBride Services, 984 Hawthorne Drive, Walnut Creek, CA 94596. Order phone number (415)939-5285. 1/90

**BY Teachers for Teachers:** "Grade Management System" Personalized... Stay organized. You set up to: 12 grade values-9classes-50 students. 3.5-inch disk for PDD. Tandy 100/102, 200. We

also customize 5 *BASIC* programs. \$49.00+\$2.00 (S&H). Software by Stef-fens', 1731 William Ct., Little Chute, WI 54140.

## HARDWARE

Data Acquisition with M100/102. REL, RR1 Box 113F, Royalton, VT 05068. (802)763-8367. 10/91

## FOR SALE

**Run a BBS from your Model 100!** For details, send \$3.00 to Keith Graham, P.O. Box 6065, Omaha, NE 68106. 5/90

**PICO Magazine Back Issues!** All 37 available copies for \$39.95. Portable 100, 145 Grove St., POB 428, Peterborough, NH 03458-0428. (603) 924-9455

**WP-2 ROM simulator card!** Plugs into the expansion card slot of the WP-2. Holds up to four 256Kbit EPROM's or two 1Mbit EPROM's. \$89.95 each. Midwest DataCard Marketing (513) 433-2511 12/90

## WANTED

Hobby contact wanted with Tandy notebook users in Paris and suburbs. Possible program exchange. Speak English, French, and Model 100 assembly language. Call 45-03-12-16 Paris phone, or write Mike Kelton, 39 Avenue Paul Doumer, 75116 Paris, France. 4/91

## New LOW Rates!

Businesses—90¢ per word  
Non-business—60¢ per word  
Find those items you need, sell the ones you don't, start a business inexpensively!

## HOW TO PLACE A CLASSIFIED AD

Categorize your advertisement (Hardware, Software, Services, Wanted, Etc.) and carefully type your message. We are not responsible for correctly interpreting handwritten advertisements. Phone numbers, street numbers, dimensions, and any abbreviations count as one word. Logos, company or product, are not allowed, neither are display advertisements. Business rates are 90¢ per word; non-business rates (individuals advertising) are 60¢ per word. Add up the cost and send the advertisement copy with a check, money order, Visa, or Mastercard number to: Portable 100 Classifieds, 145 Grove St. Ext., P.O. Box 428, Peterborough, NH 03458-0428, c/o Linda Tiernan. Make checks payable to Portable 100 Classifieds. Include your complete return address and phone number (phone number is printed only if it is included in the advertisement itself). Materials due the 1st of the month, two months prior to the magazine cover date (example: materials for the February issue must be received by December 1st.) Advertisements received after the deadline will appear in the next scheduled issue. Payment must accompany order. No refunds for advertisements that miss deadlines, regardless of reason. We reserve the right to change advertisement categories, and to reject, edit, or cancel any advertisement we deem improper. There are no agency discounts for classifieds. **For faster service call 603-924-9455.**


Ad Category \_\_\_\_\_ No. of words x (90¢)(60¢) \_\_\_\_\_ #Issues to run \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Total Enclosed x (Ad Cost x Issues) \_\_\_\_\_ Phone Number \_\_\_\_\_

Visa/Mastercard Number \_\_\_\_\_ Exp. Date \_\_\_\_\_

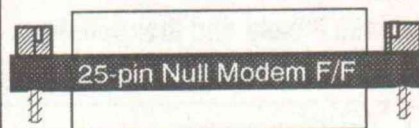
Signature \_\_\_\_\_

## Low-Profile Null Modems!

*These ultra-small null modem connectors let your Model 100, 102, 200, or 600 computer talk directly to any other computer.*

*So small and light you can always keep it right with your computer!*

*Direct connections in half the space! Drawing is ACTUAL SIZE!*



25-pin Male-to-Male, Male-to-Female, or Female-to-Female  
**only \$25.00ea**

The internal pin connections are:  
1-1, 2-3, 3-2, 4-5, 5-4, 6&8-20, 20-6&8, 7-7

**Portable 100—Hardware**  
P.O. Box 428, 145 Grove St. Ext.  
Peterborough, NH 03458-0428  
**(603) 924-9455**

Visa, MasterCard, Amex accepted.  
Please allow 6-8 weeks for delivery

Circle 19 on reader service card.



Continued from page 3.

our buns; please do your part. Support our advertisers. Tell non-advertisers why you didn't buy from them. And stop giving your P100's to your buddy! It hurts us all in the long run. Make him get his own sub. I don't even give my friend John freebies. (Maybe that's why he doesn't think I'm funny anymore?) Whatever ... take an active role, and we can do all these things and more! Thanks!

One last item. To you servicemen and women returning from the Persian Gulf, some of whom are members of the P100 family of readers: WELCOME HOME! We're glad you're back! To those still abroad: We hope you'll come home soon! And to all of you: May your future troubles be no more serious than an occasional cold start.

(John probably thinks cold starts are funny.)

*Nugels*

## Coming Soon in P100!

**Reviews:** Telecommuter/X-TEL; Tandy 1400 40MB internal hard drive; WP2DOS; StayAround; 100duet; and more!

**Features:** Tandy 100/200 teaches typing in one hour; interviews with advertisers; students using Tandy 102's (and their essays on using them); the WP-2 TELCOM fix—from one who's done it; and more!

**Programs:** Race timer; Create miniature text on the M100 screen; Two programs for safer flying; and more!

## Free Information

For free information on products advertised in this issue of Portable 100, locate the Reader Service number corresponding to the advertisement that interests you. Circle the number on the Reader Service Card at page 23 (or on the protective mailing wrapper if you are a subscriber) and drop it into the mail. The literature you've requested will be forwarded to you without any obligation. Please allow 3-5 weeks for delivery.

### ADVERTISERS

RS#		Page
21	Adtron Corporation	15
9	Cabochon	29
159	Club 100: A Model 100 User Group	1
162	Club 100: A Model 100 User Group	18
164	Club 100: A Model 100 User Group	19
148	Computer Options Unlimited	15
5	Destiny Technology	5
81	EME Systems	17
82	EME Systems	23
83	EME Systems	34
30	Granite Street Portables	20
35	Granite Street Portables	32
17	Herne Data Systems	5
116	King Computer Services	9
37	MicroMime	9
29	Microsense	14
41	Node Systems	10
121	Paul Globman	13

### ADVERTISERS

RS#		Page
39	Personalized Software	13
45	Pacific Computer Exchange	16
13	Portable 100—WP-2 Book	17
7	Portable 100—Hardware	CII
19	Portable 100—Hardware	35
55	Purple Computing	16
49	Purple Computing	5
151	Robert Rice	17
20	Shreve Systems	20
128	Software Versand	20
18	System Peripheral Consultants	16
71	Tri-Mike Network East	6
73	Tri-Mike Network East	24
74	Tri-Mike Network East	31
72	Tri-Mike Network East	CIV
134	Ultrasoft Innovations	26

### New Products

62	Cabochon, Inc.	27
60	North Shore Systems	27
66	Tri-Mike Network East	27

# FINGERS TIRED?

Accomplish more... in less time.  
Get the P100-To-Go program disk.

**Make your life easier!** Save hours of time from typing in lengthy programs. Never worry again about typing errors. Have more fun with Portable 100's new disk-of-the-month service. Every program from the magazine is included on each month's disk. No typing. No trouble.

**We make it easy and inexpensive.** You deserve value. At Portable 100 we believe in value. That's why we're not only making each month's programs available on 100K Tandy Portable Disk Drive disks (which work in 200K drives), we're also



making sure any extra room on each disk is packed with interesting and fun bonus programs. All files are in .DO format. Ready to load. Ready to go.

**Not just for the Tandy 100.** The P100-To-Go disks will work with any computer that uses the Tandy Portable Disk Drive, the Brother FB100, and the Purple Computing Portable Disk Drive. This means your NEC-8201/8300, Tandy 100/102, Tandy 200, Olivetti M10, and Kyotronic KC-85 can all load these programs into memory (once loaded, changes for specific computer models may be required, refer to corresponding program article for information about compatibility with particular computers).

**Subscribe and save!** You can order P100-To-Go disks individually at only \$9.95, but for maximum savings sign up for our **Six-pack Special**, one disk each month

☐ **Yes!** Save me hours of typing time. Sign me up for your **Six-pack Special** (6 monthly disks of the Portable 100 programs, plus the special bonus programs included with every disk) for only \$47.70.

- ☐ **P100-To-Go** 1988 disk set (Jun.-Dec. 1988) \$47.70.
- ☐ **P100-To-Go** 1989 disk set A (Jan.-Jun. 1989) \$47.70.
- ☐ **P100-To-Go** 1989 disk set B (Summer '89.-Feb. 1990) \$47.70.

#### Individual P100-To-Go disks at \$9.95

- ☐ Jun '88 ☐ January '89 ☐ Summer '89 ☐ March '90
- ☐ July/August '88 ☐ February '89 ☐ October '89 ☐ April '90
- ☐ September '88 ☐ March '89 ☐ November '89 ☐ May '90
- ☐ October '88 ☐ April '89 ☐ December '89 ☐ Nov. '90
- ☐ November '88 ☐ May '89 ☐ January '90 ☐ Dec. '90
- ☐ December '88 ☐ June '89 ☐ February '90 ☐ Mar. '91

To place your order immediately, call:  
**603-924-9455**

Prices include postage and handling. Please allow 4-6 weeks for delivery. Foreign airmail add \$2 per disk. All foreign, US Funds drawn on US banks only.

- ☐ Payment enclosed (check or money order)
- ☐ MasterCard ☐ VISA ☐ Amex

CARD NUMBER \_\_\_\_\_ EXP. DATE \_\_\_\_\_

SIGNATURE \_\_\_\_\_

NAME \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Mail to: Portable 100, P100-To-Go,  
P.O. Box 428, Peterborough, NH 03458-0428



# PICO BACK ISSUE BLOW OUT!

**Last chance!** If you want PICO Magazine back issues, many with articles and columns directed at the Tandy 100/102, 200, NEC-8201, Olivetti M10, and Kyocera KC-85 computers, **order now.** We've priced these magazines to **MOVE** at the incredible low rate of just \$2, S/H included. The minimum order quan-

tity is \$10.00 (foreign shipping is \$1.50 per magazine for Surface).

**Get all available issues (35) for only \$39.95**

If you want any of these, just photocopy this page, circle the ones you want, add them up, and mail your check with the photocopy to: Portable Computing Int'l Corp,

PICO Back Issues, P.O. Box 428, Peterborough, NH 03458. For faster service call 603-924-9455 and have your Visa, Mastercard, or Amex cards handy. Order **TODAY**, they might be **GONE** tomorrow! *Note: The italicized entries in each month below are Tandy 100/102 related articles.*

## 1985

**January:** DG has the One to Go, *Model 100 Proves Itself in the Jungles of Nicaragua*, Meet the Dulmont Magnum, *Telecommuter: Software that's Ingenious*, Kyocera's Three Aces. End Telephone Tag with M100's.

**February:** NEC Wishing upon Its Starlet, In-Depth Reviews of HP 110, Sharp PC-5000, *Chattanooga Systems AutoPen, AutoPad, Trip.*

**March:** Reviews of Epson Geneva and Osborne 3, Comparisons of Two Thermal Printers (Brother HR-5 and Printex TH-160); *The Pluses and Minuses of Batteries, M100 Data Acquisition.*

**April:** Reviews of Sord IS-11, Sharp PC-1350, *DISK+, T-BASE*, and Roadrunner; *Free Software: Textpro*, Technology Transfer Damming the PICO Pipeline to Russia.

**May:** Review of DG1, Which Spreadsheet Should you Buy? Servicing Picos, LCD Screens in Color, Federal Express.

**June:** Reviews of Tandy 200, *2.2 Companion*, and *T-Backup*, *M100 File Transfer*; Wrangler improves the Odds with Sharp PC-5000s, Dow Jones News/Retrieval On-line Database, *Courtroom M100's.*

**August:** Reviews of Datavue 25 and *Touchbase Modem*; QuickTrip Convenience Stores More Efficient, Tracing Tribal Roots and Translating the Bible in Jungles of Papua New Guinea.

**September:** Reviews of HP Portable Plus, *WriteROM, ThinWrite 80 Portable Printer*; A Flat Mac, *M100 Meets Challenges at Woods Hole Oceanographic Institute.*

**October:** Reviews of Kaypro 2000, *T-View 80*; Computerized Fire Department, Stretching the limits of Telephone and Computer, *BASIC translation Tactics.*

**November:** Reviews of Bondwell 2, NEC 8027A Printer, CQ Haste; *PICO Formatter*, Search and Rescue Via Computers, Industry Views from an HP Exec.

**December:** Close Look at Ericsson Portable and *TMPC (time management software)*, Travel Tips, Tricks for Traveling, *Dialer Program*, *Project management with the M100.*

## 1986

**January:** Reviews of Gridcase 2, Access, Word-Finder, and Prospecting, CP/M and MS-DOS, *Security Program*, Can Universities Cope with Picos? News from Comdex, *Jazz up your LCD.*

**February:** Reviews of ZP-150, and LeScript Word Processing; *Stevie Wonder Inspires Stardom in M100*, Can Universities Meet Expectations of

Computer-literate Students? *Cold-Start recovery, Personalized Form Letters.*

**March:** Reviews of Panasonic Exec. Partner, Lync 5.0, and *Hardwire*; University Rethinks its Tasks, Picos in Medicine, *Auxiliary Battery Packs Spell Independence, More Muscle for the M100.*

**May:** Reviews of Toshiba T1100, IBM PC Convertible, Casion FX-7000G Calculator, SG-10 Printer; *MIKEY, Appointment Manager*, and *FAST, IRS Crowns Zenith's Z-171*, Handhelds in Restaurants.

**June:** Reviews of Zenith Z-171, *LapCoder, SuperROM, LAPDOS, and BlackJack*; Go Shopping at PC in Rochester, NY, OM10 RAM Map (pt 1), A Tale of Two City Councils.

**July:** Reviews of Bondwell, ROM2, Letterjet HS-80, and Sidestar; Electronic Cottage, Taking Stock of Investment databases II, NEC 8201A's LCD, OM10 RAM Map (pt 2).

**August:** NH's Governor discusses Laptops, PC-7000 from Sharp, Choosing your test-oriented Database manager, *Model 100/200's Lend a hand to Job Seekers*, NEC-8201A's Communication Connection.

**October:** Reviews of Toshiba 1100+, New Word, *Diconix Printers*, Fortune 500 Picos. Interview with DG Exec's, Desktop publishing with Picos.

**November:** Picos in Libraries, *Clever M100 Combinations, Exploring TPDD Part I*, Reviews of Datacomputer 2.0, *TPDD, TS-DOS.*

**December:** Picos on Wall Street, Connecting to On-line Databases, Telephone Problems, *TPDD Part II*, Reviews of *Cleuseau, French/German Tutor 3, Pocketsize Modems*; 1986 Article Index.

## 1987

**January:** Book Publishing With a Pico, *Framework in a Pico*, Review of Right-Writer, JK Lasser's Money Manager, HP+Enhanced, Electric Webster, *Disk Power*, Pico's Computer Buyer Guide.

**February:** *Poor Man's Idea Processor*, Macintosh-Pico Connection, *M100 Cursor key alteration*, Handhelds: HP-18C, Langenscheidt 8000, TI-74, Reviews of Sord IS11-C, *Lets Play Monopoly, \$100 letter quality printer.*

**April:** Browsing the Boards, Writers & Portables, KTI products, Badminton & NEC, Reviews of *Inside the M100, TTXPress Printer, PCSG Business Analyst*, Datapad 84 Zoomracks & ECFS.

**May:** Doctors with Portables, *Text to printer*, Hitting the Board of PC Convertible Add-ons, Holiday **OUT** & Shout, *M100 memory Expansion.*

**June:** Lawyers & Laptops, *Personal Management System, M100/Mainframe Terminal Prog.*, Reviews of Wang Portable, *Search, Sprint and Supercalculator*, *Best of Compuserve book*, Chess-to-go.

**July:** Programming in the Portable Environment, Sysop interview, Talking portables (pt1), Portable Computer Buyer Guide, Reviews of *TS-Random*, Software Carosel, Popcorn & the Hyperion.

**August:** NEC 8201 tokens, Laptops in Movie filming, Talking Portables, Reviews of Casio FX-8000G, Tandy 1400LT, and *System 100.*

**September:** *English Teachers use Laptops, Picos in Class*, **OUT** templates, *Picos in the Oil Patch*, Reviews of *ColorPro*, and the *Sportster 1200 modem.*

**November:** *Control That Printer, Academia & Laptops*, Laptops on Capital Hill, Starlet Secrets, Reviews of Psion II, *DVORAK keyboard*, & Spark.

**December:** Global Laptops, Starlet Software, Toronto Blue Jays & GRiD, *NiCd Notes*, Review of IMC LCD-286, 1987 Article Index.

## 1988

**January:** Portable Computer Cellular Communication, Laptop Roundtable, Pico Portable Guide, Reviews Telemagic, Direc-Tree Plus, SchwabLine, Quotrek.

**February:** TenniStat, Flexibility of Form, T200 and T16. Reviews Eclipse, T1100 Hard Drive.

**May:** Handhelds Fight Crime, A Pico in China, Compaq Port. III, Datavue Snap, Fax hits the Road, HP Portable Vectra, T1400LT, Three Pocket Modems, Close-Up's Customer & Support.

**June:** Multispeed in the Tropics, *Monitoring Alkaline Batteries*, PSION and Mass Storage, Datavue Spark, Smith Corona Portable Word Processor.

**July:** Toshiba on the Road, *Diskette Ratings, Metered NiCd Manager*, Procomm on the NEC, WordPerfect 4.2 on the T1000, Sales Ally.

**September:** Laptops & the Learning Disabled, WordPerfect 5.0, Dynamac EL, HP-71B, WordPerfect Executive, Webster's New World Writer II.

**October:** Portables at Sea, Macintosh Navigating, Piloting and Celestial Progs, NEC-8300, Compaq Port. 386. File Transfer, Golden Parachute.

**November:** European EMAIL, New Tricks for your Cassette Recorder, Pico Pillows, Amstrad PPC-640, Selecting the President, Sales Power, Sales Strategy, Office Writer goes Light.

**December:** FASTECH, Automating Your Sales Force, AI, ScriptWriter, LiteDrive, Homeword Plus, VP-Expert.



# **SUPER ROM** **Lucid Spreadsheet Write ROM Database Outliner**

**Boots  
the Tandy  
Portable Drive  
with one  
button!**



**GET IT FREE!**  
Of all orders received  
between April 1, 1991  
and June 1, 1991, one  
lucky person will  
have his or her full  
purchase price for  
this item refunded!  
**ORDER TODAY!**

## **NOW YOU CAN REALLY HAVE IT ALL!**

**All on one ROM. Truly the finest four programs  
available for the Model 100 — guaranteed.  
Try it for 30 days. If you aren't blown away by the  
excellence return it for a full refund.**

# **\$199<sup>95</sup>**

The four best programs for the Model 100 all on one ROM. 32K of power without using any RAM for program storage. This is the PCSG Snap-In ROM that just presses easily into the little ROM socket in the compartment on the back. You access the four right from the main menu like built-ins.

**Write ROM** — the definitive word processor for the Model 100. Function key formatting or dot commands. Search and replace. Library feature — inserts words, phrases or whole documents into text from just a code. MAP lets you see a picture of your document. In all there are 60 features and functions. No one can claim faster operation. **FORM** lets you create interactive forms with on-screen prompts that you can answer from the keyboard. Nothing else for the Model 100 compares with the features of Write ROM. Exactly the same as the Write ROM sold as a single program. Infoworld says it "makes the Model 100 a viable writing unit ... sur-

passed our highest expectations for quality and clarity."

**Lucid Spreadsheet:** This is the one PICO magazine says "blows Multiplan right out of the socket" and Infoworld performance rated as "excellent" and said "makes the Model 100 compute." Gives you features you cannot get with Lotus 123. Lets you build spreadsheets in your Model 100 that would consume 140-150K on a desktop. Program generating capability with no programming knowledge required. Variable column widths. Includes find and sort with function key control. It's fast, recalculates like lightning. No feature has been taken from the original, only new ones added.

**Database:** This is a relational data base like no other. You can do everything from mailing lists to invoices. No complicated pseudo-coding, you create input screens as simply as typing into TEXT. You are not limited by size; you can have as large an input screen as you wish. Prints out reports or forms, getting information from as many files as

you like. Complete math between fields. Total interface with Lucid worksheets.

**Outliner:** Does everything that Think-tank does on a PC but a whole lot better. Includes a Sort for your headlines. Lets you have headlines of up to 240 characters. Has cloning, hoisting and sideways scroll up to 250 characters. Like Lucid, this one sets a new standard for outliners. This is the way to plan and organize your projects.

Present Lucid and Write ROM owners can upgrade for \$150. If you have both it's \$125.

As usual PCSG sells the Super ROM on a thirty day guarantee. If for any reason you are not satisfied, simply return it for a full refund.

We are excited about this product. Super ROM gives the Model 100 the true power of a desktop. No other multi-program ROM has software that compares. But don't take our word for it. We invite you to make that comparison yourself. Priced at \$199.95 on Snap-In ROM.

*Got stuck with somebody else's multi-ROM?  
We'll upgrade it for \$150.*

**Another fine product  
from the innovative people at PCSG!**

*Distributed by:*

## **Tri-Mike Network East**

**P.O. Box 372, Peterborough, NH 03458 · 1(603)924-8663**

© PCSG

MC, Visa, American Express, Check, or C.O.D.

**Circle 72 on reader service card.**